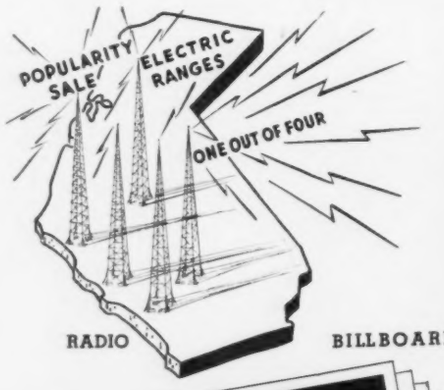
ELECTRICAL WEST

THE ALL-INDUSTRY MAGAZINE OF PROGRESS

MCGRAW-HILL CO.
CALIFORNIA

MARCH, 1941

25c a Copy



RADIO

BILLBOARD

BIG ADS

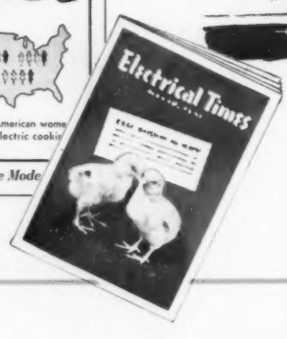
Smashing "Popularity" RANGE SALE

OPENS SPRING SELLING SEASON

★ Edison's big "Popularity" Range Sale opens the Spring selling season with a bang! This campaign, more complete and comprehensive than any in years, utilizes every advertising medium to promote sales of electric ranges. Compelling newspaper advertisements, timely radio announcements, colorful billboards, displays and window streamers set the stage for profitable business by alert range dealers throughout Edison territory.

Now... A SENSATIONAL "BUY ELECTRIC" OPPORTUNITY TO SAVE DURING THIS BIG
ELECTRIC RANGE
"Popularity"
SALE
"America is Switching to Electric Cooking Faster and FASTER"
Six Years Ago
Now!
Only one out of fifteen women were changing to the easier 'Electric' way
One out of Four American women are switching to electric cookin
And During This SALE Hundreds Will Switch to the Mode

DIRECT MAIL



DISPLAY "SALE" SIGNS

SOUTHERN CALIFORNIA ALL-WINTER SUN FESTIVAL

SOUTHERN CALIFORNIA Edison

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), March, 1941. Vol. 86, No. 3. Published monthly by the McGraw-Hill Company of California, 68 Post Street, San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, and Canada, $2 per year; all other countries $3 gold (thirteen shillings). Single copy 25c.
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N PITTSFIELD WORKS—READY FOR THE ASSEMBLY LINE

WHERE QUANTITY PAYS YOU DIVIDENDS

THERE is *extra value* for you in the fact that we build distribution transformers by the tens of thousands. Large-scale manufacture makes possible ingenious line-production facilities and methods. Rigid adherence to General Electric standards dictates the use of the highest quality of workmanship and the best materials obtainable.

With such facilities, and through major developments, culminating in the application of the Spirakore design to a wide range of ratings, we have been able to provide you with transformers having superior characteristics, less weight, and smaller dimensions—at price levels that have been consistently lowered during the last several years.

GENERAL ELECTRIC

402-23

Here in the WEST

People

H. H. Skilling

is acting head of the electrical engineering department at Stanford University, and in this capacity he headed up the research project in house heating in California which has been going on there for some two years under the Hicks Fellowship.

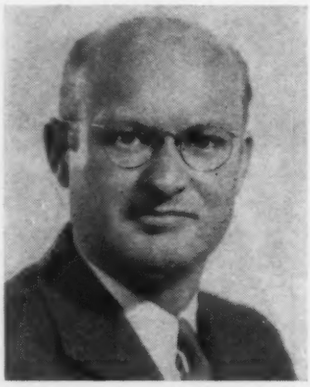
P. F. Offerman and W. J. Walsh, co-authors of the article on p. 37, participated in the Fellowship as graduate students in electrical engineering at Stanford.

Dr. Skilling began his electrical career at Stanford, where he graduated with an AB in '26. He worked two years for Southern Cal Edison, with construction forces at Big Creek, then taught at Stanford for a year. He got his master's at MIT in '30, his PHD at Stanford in '31. He has been the author of several AIEE papers, most of his work having been in the field of electrical transmission.

Skilling

C. F. Dalziel

sits on the other side of the stadium at big-game time, being assistant professor in electrical engineering at University of California, where he also took his various degrees.



Dalziel

California gives a BS to its engineering graduates, and Charlie Dalziel got this in 1927, at which time he went with General Electric on the two-year test course.

After that he went with San Diego G&E (then the Consolidated G&E) for another two-year stretch. There he dealt with system protection.

Returning to Berkeley, he got his master's degree in '34, his EE degree in '35. There he has been especially helpful to the AIEE student branch.

His electric shock research which he includes in his comprehensive article on p.40, has been attracting lots of attention.

His co-worker, and the co-author of the article, Dr. J. B. Lagen, is with the University of California Hospital, San Francisco. Dr. Lagen was scheduled to follow up with a discussion of shock as viewed by the medical man, at which time we would tell something about his past. But he says now that the Army may step in with a prior claim to his services. We have our fingers crossed.

Pages

Electric Heat in California Homes 37
By P. F. OFFERMAN, W. J. WALSH and H. H. SKILLING—A report of two years' research under the Hicks Fellowship

Practical Aspects of Electric Shock 40
By C. F. DALZIEL and J. B. LAGEN, M.D.—Survey of contemporary knowledge, investigations of the authors

ABC's of Relays 45
By E. B. KIPP—Part 7, pilot-wire relaying, concluding article on relays and their application

Ranges—Water Heaters—Refrigerators 47
A resume of sales plans, and sales prospects as they concern these major load builders. Followed by detailed reports on the new range campaigns

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Preview

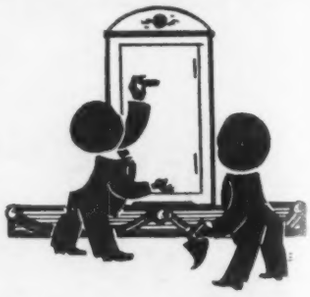
Directory

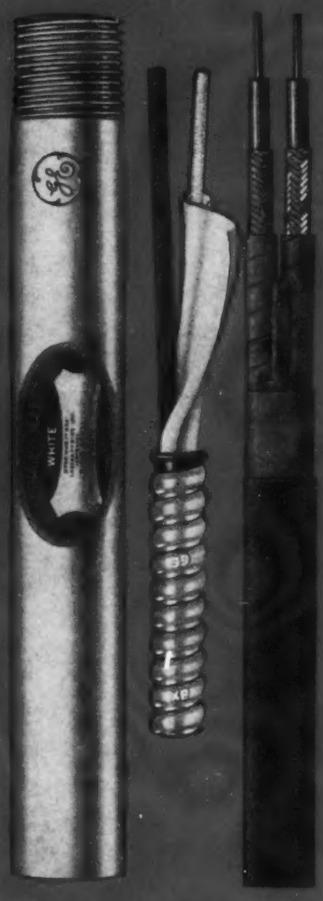
Appended to the April issue will be the Manufacturer's Directory. This is a listing of manufacturers,

their Western offices, representatives and agents, which is published once a year. It's worth keeping.

Refrigerators

Next month's Sales Guide will concern itself with refrigerators. Incidentally, you don't have to be a dealer or a salesman to get something out of the Sales Guide. Each month it sets forth, very simply, the principal attractions of an electrical appliance.



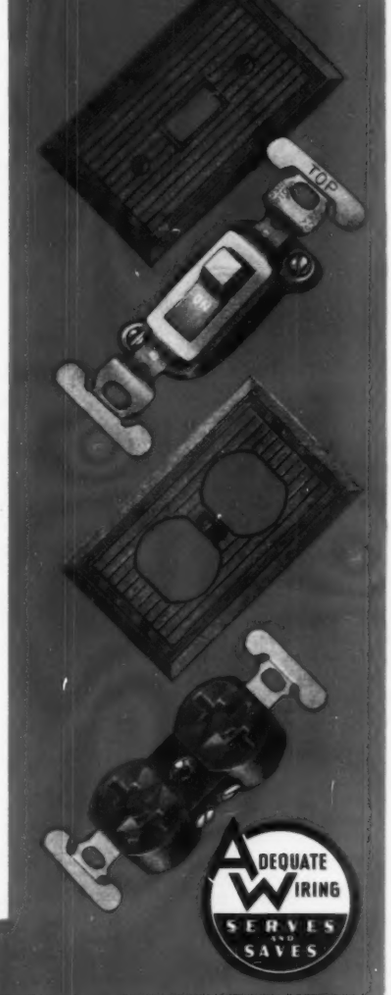


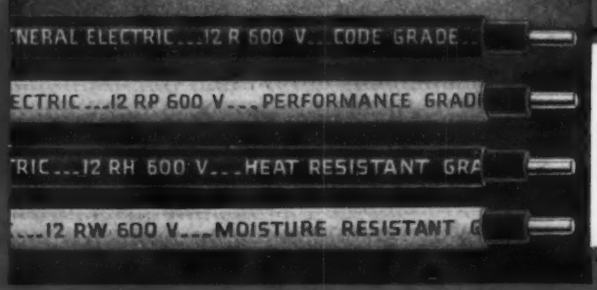
Residential wiring jobs are bigger when G-E Home Wiring is installed. It provides a proper layout, large enough wire and ample outlets to permit modern appliances to be used efficiently and conveniently. G-E Home Wiring gives complete adequacy.

The G-E line of wiring materials includes every material needed to install G-E Home Wiring—conduit, wire and cable and wiring devices. Your customers will be pleased with G-E Home Wiring and G-E Wiring Materials. They will be able to use electrical appliances as they wish, and the wiring will give them long, trouble-free service.

A handbook has been prepared on G-E Home Wiring which will help you to adapt it for any home you are wiring. This handbook contains suggested wiring specifications and material specifications.

For a copy of the G-E Home Wiring Handbook and more information about G-E wiring materials see the nearest G-E Merchandise Distributor or mail the coupon.




NERAL ELECTRIC...12 R 600 V... CODE GRADE
ECTRIC...12 RP 600 V...PERFORMANCE GRADE
TRIC...12 RH 600 V...HEAT RESISTANT GRA
...12 RW 600 V...MOISTURE RESISTANT G

General Electric Company
Section CDW-1183, Appliance and Merchandise Dept.
Bridgeport, Conn.

Name .....

Address .....

City ..... *State* .....

GENERAL ELECTRIC

WIREMOLD Carries Current to Work FOR NATIONAL DEFENSE

ADEQUATE WIRING SERVES AND SAVES

WIREMOLD

Business Building Check List

Lighting Modernization
Wiremold Surface Metal Raceways and Fittings for extension, installation, or relocation of wiring for BETTER LIGHT.

Fluorescent Work Lighting
Wiremold Fluorescent LINE-O-LAMPS, Wired and Unwired Units, and Industrial Units for both General and Local work Lighting.

Plugmold
The Wiremold Multi-Outlet Assembly in two sizes for home, office and factory. Ideal for work bench, inspection table and similar places where many convenience outlets are needed for electric hand tools, lamps, instruments, appliances, etc.

Pancake
Wiremold Overfloor Wiring System carries power, light, telephone, etc., to isolated desks, machines or appliances.

Signal System Wiring
Using Wiremold Systems "on the surface". Quickly installed, always accessible.

Opens wide opportunities for alert Contractors . . . .

THAT'S a statement worth thinking about! Thousands of feet of Wiremold Products have already gone into National Defense work. They symbolize a vital contribution that Wiremold, and the men who install Wiremold, can make toward National Preparedness . . . the contribution of MORE and better electrical arteries through which the current of accelerated industry can flow unimpeded.

Wiremold supplies the increased wiring capacity thousands of factories and offices need . . . easily and above all, QUICKLY.

Wiremold supplies the new, cool, "daylight" illumination of FLUORESCENT Lighting . . . with correctly designed, easily installed, approved equipment for plant, office or drafting room.

Wiremold Systems and methods in most cases offer the great added advantage of installation WITHOUT INTERRUPTING work.

Check the list at the left. Then use your Wiremold knowledge and the help that Wiremold representatives and engineers can give you in BUILDING-UP this important part of your business NOW.

The Wiremold Company, Hartford, Conn.

WIREMOLD
CARRIES CURRENT TO WORK

"Plugmold" Multi-Outlet Assembly | Wiremold Fluorescent Lighting Equipment | "Pancake" Wiremold Overfloor Wiring System | Wiremold Surface Raceway Wiring Systems

Wireflex Wireduct Wire Mate

BOOKS *you may want*

An Electrical History

MEN AND VOLTS by John Winthrop Hammond (The Story of General Electric), Lippincott, $2.50. Readers will not find here a great piece of literary styling, but they will find a remarkably well organized and detailed electrical history, packed with dozens of the industry's anecdotes and legends, covering a great deal more ground than is implied in the sub-title, "The Story of General Electric". The pictures, alone, showing the step-by-step development of the electrical arts, the appearance of the various pieces of equipment, etc., make a story in itself. It is, moreover, a history in terms of men, and in its pages are those who built the electrical industry and science. John Hammond began the work in 1922 and continued with it until his death in 1934. His diligent research led to a 300,000-word manuscript which was later edited and condensed by Arthur Pound.

A Directory and Maps

DIRECTORY OF ELECTRIC GENERATING PLANTS, published by the Federal Power Commission, with 27x42-in. 10-color map of the principal electric generating plants and transmission lines of the United States, $1. The Directory lists all electric utility generating plants in the United States of 1,000 kw. or more and classifies them by age, size, and type of prime mover. They are shown in groups according to classes of ownership in each state. Data includes capacity, generation, fuel and fuel costs for fuel plants, gross static head for hydro plants, number of employees, and period of installation. The map is also sold in a 4½x7-ft. size, 10 colors, $2.50 unmounted and $5 mounted on linen, a copy of the directory being included with each map. Sold only by the FPC, Washington, D.C.

A Lab Manual

EXPERIMENTAL ELECTRICAL ENGINEERING & MANUAL FOR ELECTRICAL TESTING, Vol. II by V. Karapetoff, John Wiley & Sons, Inc., $7.50. This is the fourth edition of an exhaustive text for engineers, and for students in engineering laboratories—volume II assuming an understanding of material in Volume I. It is assumed, for example, that the reader has the ability to deal with vectors and vector operators. Fourth edition has been an attempt to clarify and supplement earlier editions and includes the addition of 300 drawings and illustrations, and descriptions of new types of apparatus such as the Allen & Gross fault locator for overhead lines, and the Crocker Wheeler adjustable speed a.c. motor.

The EEI on Petersen Coils

INDUCTIVE COORDINATION ASPECTS OF PETERSEN COIL GROUNDING, Edison Electric Institute Engineering Report No. 42. Presents a brief description of Petersen coils as to theory and extent of use, then discusses those features affecting inductive influence. These include: residual current distribution, duration of faults, percentage of faults likely to be cleared without breaker operation, means of clearing, noise effects. Price of the bulletin, obtainable directly from EEI. is 25c to members and employees, 75c to others in the U. S.

MEET REGULATION'S BIG FIVE!

Famous Five-Way Savings of Allis-Chalmers 5/8% Step DFR Regulators Catch the Eye of America's Utilities. Check These Fundamentals of Regulator Economy for First Hand Information on How You Can Make Your Regulation Dollars Go Farther!

1 CLOSER REGULATION! Because there is no limitation due to auxiliary holding devices on the voltage control relay or the need of a motor brake to prevent overshooting, "Feather-Touch" Control permits band width settings within ± 5/8 of 1%.

2 LOWER EXCITATION CURRENT! Elimination of air gap means that the transformer type DFR requires only a fraction of the excitation kva needed by older types of regulators.

3 REDUCED LOSSES! The copper loss of the 5/8% Step Regulator approaches zero at the neutral position . . . around which a high percentage of operations occur.

4 QUIETER OPERATION! With no air gap, fringing flux or clatter of gear train and relays, the Allis-Chalmers DFR makes no more noise than a distribution transformer of equivalent size.

5 MINIMUM MAINTENANCE COSTS! DFR's "Feather-Touch" Control, with low energy circuits, supersedes holding and braking devices . . . removes one big source of maintenance. Complete oil immersion of all moving parts eliminates the need for other lubrication. What's more, in the seven years Allis-Chalmers 5/8% Step Regulators have been in service, *not a single contact has ever been replaced due to deterioration under normal operation.*

Our new bulletin B-6065 gives complete information on how the Allis-Chalmers 5/8% Step Regulator can cut regulation costs on your system. Write for your copy . . . *today!* A 1311

ON THE LINES OF A MID-western utility, many Allis-Chalmers 5/8% Step DFR Regulators, like the two 72 kva, 4800 volt units shown here, deliver better regulation at lower cost.

These 5/8% Step Regulators Are Famous for Better Regulation at Lower Cost! Choose the Regulator to Fit Your Purpose!

DFR — 12 to 250 kva, single phase
DFR — 20.8 to 750 kva, three phase
DER (air cooled) — 36-96 kva, 2400 volt, single phase

ALLIS-CHALMERS
MILWAUKEE · WISCONSIN

"What Do People Look For When Buying An Electric Refrigerator?"

THE "SIX BEST SELLING FEATURES" are given this order of importance by a nation-wide survey among refrigerator dealers: 1. Brand Name. 2. Equipment, Interior Arrangements. 3. Price. 4. Style and Beauty. 5. Economy and Performance. 6. Construction.

GENERAL ELECTRIC *"Tops In Public Preference"* IS TOPS ON EVERY POINT!

1. *Brand Name.* Independent surveys conducted by five national magazines show that 50% *more people prefer the G-E than any other refrigerator.*

2. *Equipment, Interior Arrangements. New* Perfected Conditioned Air! *New* 10-Star Storage Features with the amazing new Butter Conditioner!

3. *Price.* G-E prices start at $119.95, with a model built to *everybody's* income. Dollar for dollar, it's the best buy in refrigeration.

4. *Style and Beauty.* In no other refrigerator cabinet will you find such a rare combination of beauty and quality!

5. *Economy and Performance.* No other sealed cold-making mechanism has the proved performance record of the famed G-E Thrift Unit for enduring economy.

6. *Construction.* In the notable list of G-E "firsts" is the all-steel cabinet, stainless steel evaporator, Thermocraft insulation, Textolite door strips, Glyptal enamel, and, of course, the *sealed* mechanism.

GENERAL ELECTRIC

Permits precision of application

● Precision in the application of "National" brushes to your equipment is made possible by the close degree of uniformity to which those characteristics affecting performance are held.

Careful analysis of raw materials, accurate compounding of mixes, close control of pressure, temperature and time in production processes, inspection at each stage of production, and determination of final characteristics and performance make "National" brushes outstanding in respect to uniformity.

National Carbon Company engineers will recommend the grades adapted to your service.

SPECIFY NATIONAL BRUSHES
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NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation

UCC

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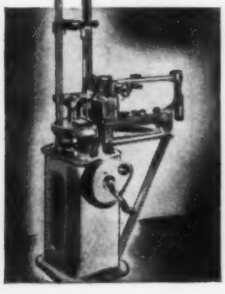
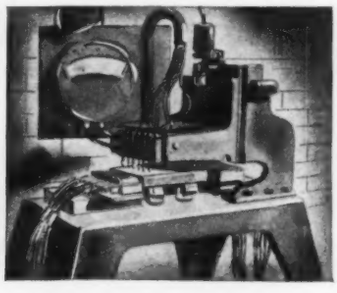
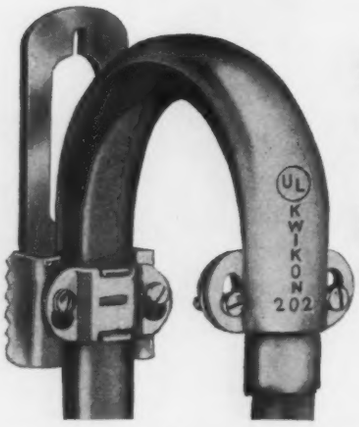
BRANCH SALES OFFICES: NEW YORK, PITTSBURGH, CHICAGO, ST. LOUIS, SAN FRANCISCO





Here's How

to install



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Faster—More Economically

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Economy and an easier and faster installation have made Kwikon No. 202 a national favorite. Improved by the new hanger type back, which makes the assembly and installation so much easier, it comes to you at no additional cost.

To be completely satisfied on your next Service Cable Head requirements, use Kwikon No. 202.

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for **EASE . . .**

ECONOMY . . .

EFFICIENCY . . .

In Making Underground Splices—Use

NATIONAL Split Tinned COPPER CONNECTORS

The use of National Connectors for making underground Cable Splices, saves time, and increases accuracy and efficiency. These connectors are made exact to size of the best grade pure soft drawn copper in a size range from 12 B. & S. solid to 2,500,000 C.M. They have a guaranteed conductivity of 98% or better. You'll find that it will pay to standardize on "Nationals" for underground jobs.

THE NATIONAL
TELEPHONE SUPPLY COMPANY
5100 Superior Avenue • • Cleveland, Ohio

PRODUCTS

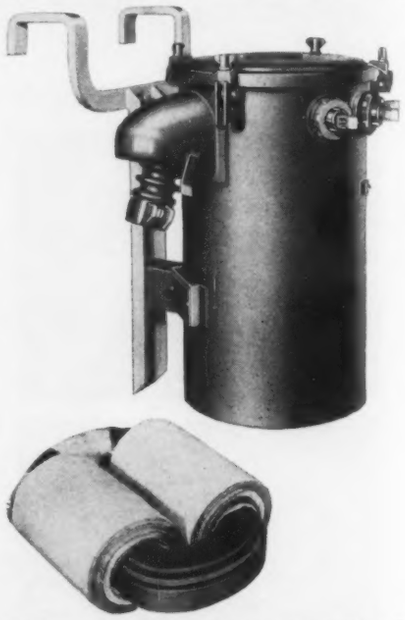
that are new

New Bushings (318)

Four distinct improvements are being incorporated in oil-filled apparatus bushings manufactured by the Ohio Brass Co. These are complete sealing, a magnetic oil level indicator, greater use of internal porcelains, and an interchangeable terminal system for transforming units. Complete sealing was accomplished by re-designing the oil expansion chamber, permitting space to keep internal pressure within space limits without necessity for vent or breather. This feature permits storing or handling in any position and allows units to be installed immediately without oil addition or servicing. On the new indicator, a permanent magnet attached to the dial pointer follows the movement of a similar magnet operated by a pivoted float within the oil reservoir. Among other things, this cuts out the possibility of oil leakage through the gage glass and discoloration of oil by sun rays. The purpose of more internal porcelain to increase the factor of safety, improve overall efficiency and increase dielectric stability. The interchangeable terminal system reduces the number of bushings which must be carried in stock.

Wound-Round Transformer (319)

Wound-Round is the name of a new Line Material Co. transformer, designed to improve over-all efficiency and service life. The

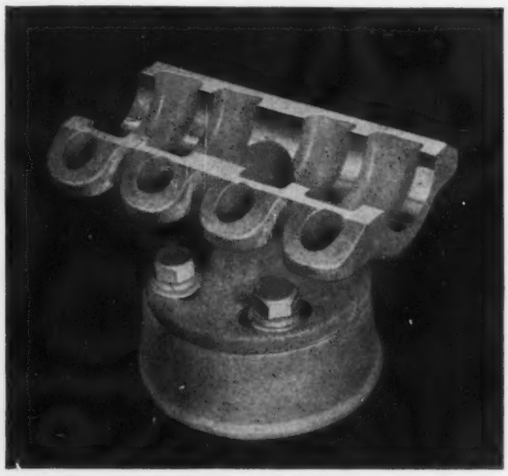


transformer has a wound core and round coils, incorporates all new mechanical standards specified by EEI and NEMA, and is described in detail in a bulletin available from the company.

Pole Platform (320)

A utility platform, easily attachable to iron, concrete or wood poles, is announced by James R. Kearney Corp. Design aims at dependable strength and safety with minimum weight. All platforms receive 750-lb. "end-of-board" test before shipment, and breakdown is said to exceed 1,700 lb. at platform end. Available in 24 and 30-in. lengths, 22 and 23 lb. respectively.

This QUICK, EASY ASSEMBLY of BUS FITTINGS...



Assured by Pacific Electric's Perfectly-Matched Sections

You have quick, easy assembly of Pacific Electric Bus Fittings. They come to your job in perfectly-matched sections, machined carefully, with bolts, lock-washers and nuts fitted and assembled.

Your men waste no time looking for parts. Pacific Electric saves your time.

YOU SAVE MONEY

Carefully-machined sections assure accurately-fitting conductors—quick, easy assembly. Loose-fitting sections mean excessive temperature rises, work loose and are not safe.

Safety Plus

Made by skilled craftsmen under watchful supervision in our own foundry where careful control of the composition of the metal is assured, Pacific Electric Bus Fittings are extra strong—and safe. They are carefully tested for current-carrying ability.

Maximum Current-Carrying

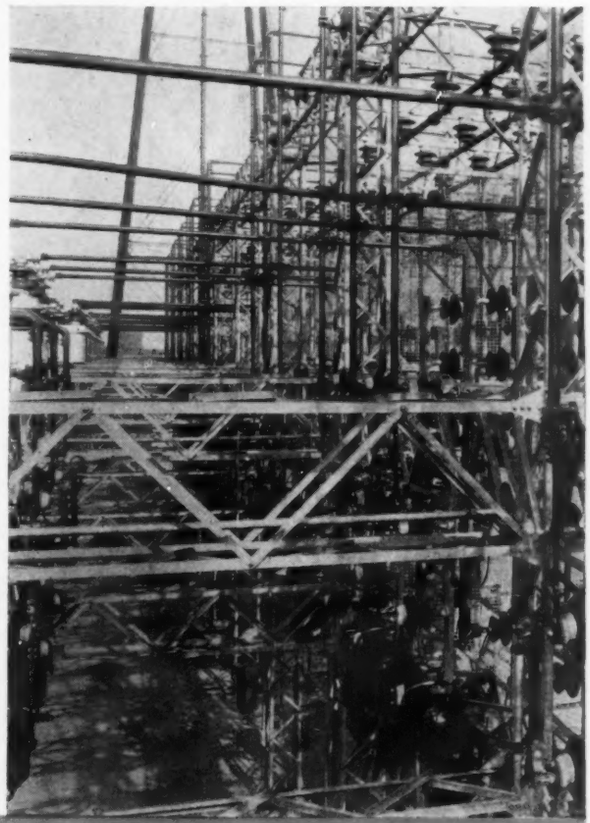
Their accuracy and perfect machining gives snug fittings which provide full-current-carrying capacity.

Long Reliability

Scores of utilities rely upon Pacific Electric Bus Fittings, made of our SPECIAL COPPER ALLOY, famous for great resistance to atmospheric conditions.

Quick Deliveries

You get quick deliveries of all standard sizes and types. Special sizes made to order. All quick and easy to assemble. Write now for Bulletin No. 69.



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Seattle, Wash.

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230 U. S. Nat'l Bank Bldg.
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C. C. Musgrove
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Dallas, Texas

Northwest Supply Co.
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Butte, Montana

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J. E. Redmond Co.
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Walker Electric Co.
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Boise, Idaho

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Banking by Mail for BUSINESS FIRMS

CONVENIENT

Overnight service to most points in California.

SAFE

Used in increasing numbers by out-of-town business houses.

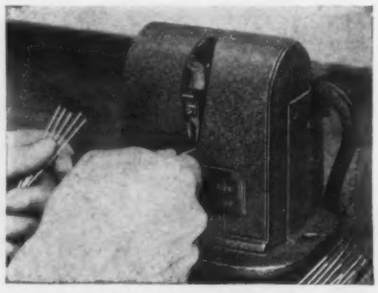
ECONOMICAL

Saves money because it saves valuable time.

CROCKER FIRST NATIONAL BANK
OF SAN FRANCISCO
California's Oldest National Bank
Member Federal Deposit Insurance Corporation

Wire Stripper (321)

A wire stripper with electrically heated blades is being offered by the Ideal Commutator Dresser Co., of Sycamore, Ill. Wires are inserted between blades, a foot pedal is pressed bringing the blades against the insulation and burning—in two parallel grooves down to the conductor. Grooves are completed with a slight twist to the right or left, and



a pull removes the insulation leaving a clean edge. The stripper is sold for installation on present production-line bench or table. Parts furnished include standard head, control box with transformer, water drawer, foot rest, pedal and connecting rod. Standard voltages are 110-120, 50-60 cycle.

Interference Locator (322)

An interference locator differing basically from other designs by Sprague, called Model IL-2, with tuning ranges of 500 to 1700 kc.; 1.7 to 5 mc.; and 15 to 32 mc. has been announced by that company. It operates either from self-contained batteries or from 115 volts a.c. or d.c., is equipped with directional loop antennae mounted on top of the cabinet when in use or carried within a cover recess. Sensitivity is stated as such that an input signal of less than 2 microvolts will produce a deflection of 10% on the output meter scale. It has both a loudspeaker and a 2-range calibrated output meter. Coaxial cable is available at extra cost. The locator is priced at $79.90 net. It weighs 23 lb., measures 15x11x8 inches.

Conduit Fittings (323)

A combination of electrical conduit fittings that can be handled in the same manner as a mitred stovepipe elbow has been announced by Johns-Manville for Transite asbestos-cement ducts. These fittings facilitate the bypassing of construction not anticipated in the design and which otherwise would be overcome only by special fittings. The combination box of these fittings is made up of sweep, curved segments and deflection couplings which can be used separately or with straight sections of duct. Long radius changes of direction can be made when two or more of the fittings are separated by straight sections.

Black-Light Units (324)

Two black light ultra-violet lighting units are announced to the western trade by Keese Engineering Co. The first is a black light outfit for lighting and activating fluorescent carpet rugs, or any other purpose where down lighting with a controlled narrow and a wide spread beam are required. The unit is designed for flush mounting and comes integral with transformer. However, transformer may be removed and operated remotely if desired. Inside the unit is a parabolic Alzac reflector adjustably mounted for regulation of the beam. Angle of spread for narrow beam is approximately from 3 degrees to 6 or 8. Unit uses the AH4-100 watt mercury lamp. Servicing and lamp replacement may be done either from above or below. The second unit is a portable one for lectures, demonstrations and stage lighting. It was designed by John T. Shannon after many years of stage experience. It consists of a transformer box with two transformers, pull chain switch for their control and a separate lamp house containing two HGEH4 mercury floodlamps and a heat resisting filter. An additional 150-watt Mazda projector lamp with a switch on the end of 15 ft. of cord is mounted in the center.

Indoor Breaker (325)

A "De-ion" air circuit breaker, designed especially for circuit protecting applications indoors in central stations, power plants, and in industrial plants, is announced by Westinghouse. This new type DH breaker is available in ratings from 100,000 to 250,000 kva. interrupting capacity; 600, 1,200, and 2,000 amp., for operation on 2500 and 5000 volts, three phase, 60 cycle ac. The new breaker includes inlaid silver-to-silver main contacts; arcing contacts of a special tungsten alloy; isolation of high voltage and control circuits; and the "De-ion" method of arc quenching, which in this breaker employs a special magnet coil to forceably draw out the arc quicker. Closing operation is of the solenoid type, wtih a mechanism that is mechanically and electrically trip-free. Contact opening is accelerated by strong springs. The breaker is compact and suited to a horizontal draw-out metal clad structure. It can be installed so that access to the rear, except for connecting the main leads, is unnecessary.

Motor Controls (326)

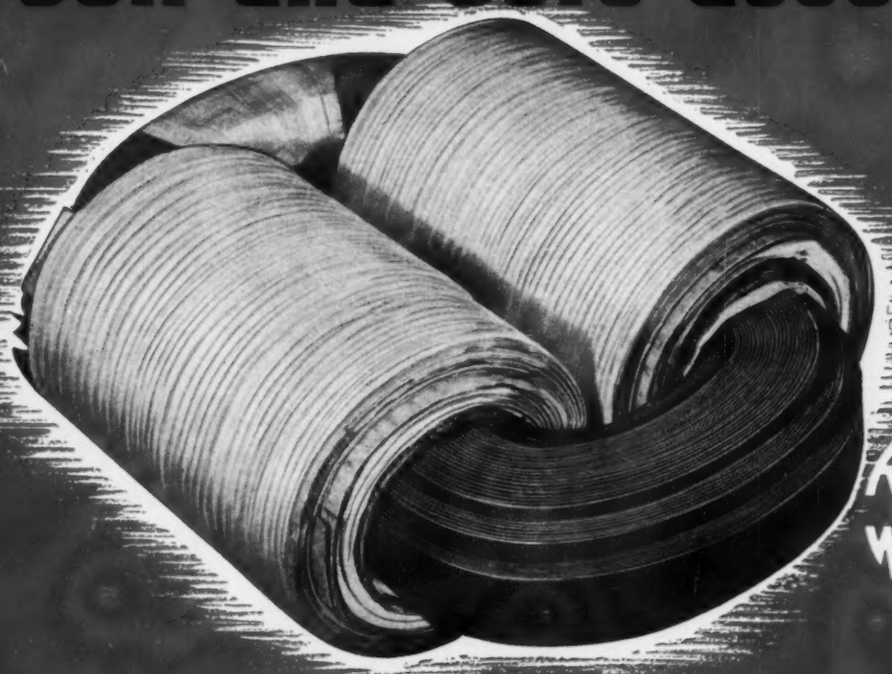
Colt's Patent Firearm Mfg. Co., Hartford, Conn., has enlarged its line of motor controls with a series of magnetic ac, contactors, bulletins 501 and 502, for general purpose alternating current duty in sizes 0 and 1. Rated horsepower for motor control and suitable to use with push button stations or pilot devices, they embody several features among which is 3-point ballbearing suspension of the movable electro magnet assembly.

Welders (327)

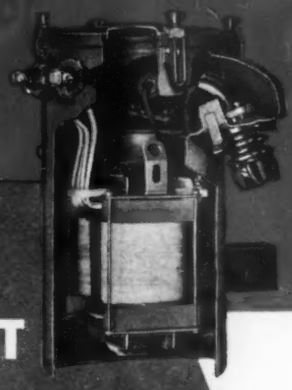
Emerson Electric Mfg. Co., of St. Louis, has announced a line of a.c. arc-welders to include four models with maximum capacity of 75, 150, 200 and 300 amp. The model illustrated has a selection of 18 welding heats and a range of 20 to 200 amp. It operates on 220 volts, 60 cycles, single phase. As another

model, cabinet is of heavy-gage metal, black lacquer finish, chromium trim. It has Underwriter approval. Among its features are portability and double-spun glass insulation on transformer windings to withstand high temperatures.

This coil-and-core assembly



of the L-M ROUND-WOUND transformer gives you



GREATER REVENUE
LOWER OPERATING COST
BETTER SATISFIED CUSTOMERS

The coil-and-core assembly of the L-M ROUND-WOUND Transformer that is illustrated here establishes a new standard of performance characteristics for distribution transformers.

It is an entirely new and different type of coil construction. For the *first time* two round coils are wound directly onto a wound core that has not been disturbed after annealing.

This combination of round coils — long recognized as the ideal coil shape for transformers — with a wound core of cruciform shape that has *not* been *disturbed after annealing* gives the L-M ROUND-WOUND transformer lower reactance, lower resistance, lower impedance, uniformly high impulse strength, and improved time-temperature characteristics.

Because of this new design of coil-and-core assembly and the resulting superior performance characteristics, the L-M ROUND-WOUND transformer surpasses all other distribution transformers because it provides better regulation at all power factors, and better ratio of losses, uniformly longer service life, and uniformly low exciting current.

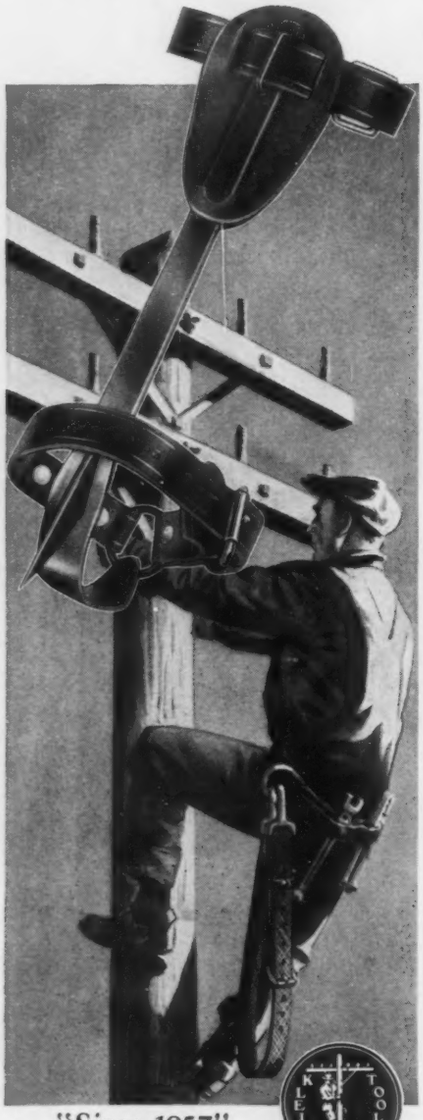
Due to better regulation at all power factors, the L-M ROUND-WOUND transformer will deliver increased voltage to your customers. As a result of lower reactance it will reduce flicker complaints. Because of its lower copper losses, better ratio of copper to core losses and longer service life, it will materially reduce your operating costs.

Amplified information regarding this remarkable advance in transformer design is fully covered in the new illustrated booklet — LMB-41161 which you may have upon request from your L-M representative, or by writing direct to Line Material Company, Milwaukee, Wisconsin. This booklet contains convincing proofs of the claims made for this development.

LM

LINE MATERIAL COMPANY

KLEIN CLIMBERS
. . . FOR SAFETY



"Since 1857"

THE spur holds firm as the lineman swings up the pole. He mounts with confidence—with ease—because his climbers are Kleins. This new "streamlined" Klein climber has more than three-quarters of a century of "know how" behind it. It possesses minimum weight—maximum strength, far more than it will ever be called upon to hold, and every pair is individually tested—Klein throughout.

Your copy of the Klein Pocket Tool Guide will be sent on request.

DISTRIBUTED THROUGH JOBBERS

Foreign Distributor:

International Standard Electric Corp., New York

Mathias **KLEIN** & Sons

Established 1857 Chicago, Ill. U.S.A.

3200 Belmont Avenue, Chicago, Illinois

Plastic Fixture (328)

Solar Lighting Fixture Co., of Los Angeles, has announced that a tandem type lighting fixture in plastic, taking a standard general service lamp, and designed to fill the general lighting needs for the semi-indirect fixture, has been made available to the trade. Local agent is the Associated Theatrical Service.

The development of shielded nozzles for the discharge of carbon dioxide into the ventilating ducts of generators in the event of fire has been announced by the Walter Kidde & Co., of New York. Advantages claimed for the new nozzles are that they eliminate objectionable high jet velocity and turbulence and also achieve a more rapid and uniform distribution of carbon dioxide gas throughout the machine.

Non-Inflammable Transformer (329)

Wagner Electric Co. announces a new type transformer, filled with a non-inflammable synthetic liquid developed as an improvement over regular transformer oil and called Noflamol.

To Measure Ground Resistance (330)

Copperweld Steel Co. is offering a simple, inexpensive instrument for measuring the resistance to ground of a ground electrode. It is intended, for example, to indicate whether the resistance of a ground is 10, 15 or 20 ohms and is not intended for fractional ohm readings, although its accuracy within its 1-1,000-ohm range is comparable with that of other accepted instruments. It employs an adaptation of the fall-in-potential method, is essentially a constant-current device.

Demand Meter (331)

Intended for watt-hour-demand-meter applications where space is limited is a new Lincoln meter, Type JWS. It combines the Sangamo Type J with the Lincoln Type WD watt-demand meter in a single unit with a single set of terminals, fitting standard watt-hour meter sockets. Suitable for indoor or outdoor service. Described in Lincoln Bulleton W-6.

FM Receiver (332)

A newly-engineered radio receiver which will make available programs broadcast by frequency modulation as well as standard American broadcasts and domestic and foreign short-wave transmission, has been presented by the General Electric radio and television department. The new receiver, designated model JFM-165, and carrying a recommended list price of $175 in most sections of the country where FM programs are now or shortly will be available, is the first combination model to be built by General Electric since the recent formal allocation of commercial frequency-modulation transmission channels by the Federal Communications Commission.

One of the most interesting features of the new receiver to those who have been enjoying the limited FM programs of the past year are the triple beamascopes, built-in antennas developed by G-E radio engineers. Each antenna has been designed for a special purpose, and in the majority of cases the need for an outside antenna or ground connection has been eliminated. The standard broadcast beamascope, first adopted by General Electric for regular AM receivers three years ago, is a highly efficient antenna designed for the reception of programs on the standard broadcast band.

STRENGTH, ruggedness and durability are combined with definite economy in *Crapo* Galvanized Steel Strand. Low first cost, low maintenance expense are matters of record wherever this time-tested product is in use. Available in all standard grades and sizes from representative jobbers throughout the country. Or, write—

INDIANA STEEL & WIRE CO.
MUNCIE, : : INDIANA

Wirelato

Tapered spring insert presses clean threads into wires — acts as current-carrying sleeve. ¼" moulded composition shell unaffected by heat, cold or moisture.

STANDARD THE WORLD OVER!

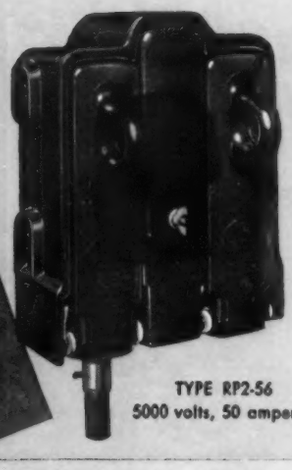
IDEAL FOR FLUORESCENT WIRING

- Just strip wires—screw on—that's all!
- No solder, no tape, no blow torch!
- Better electrically—stronger mechanically.
- Not affected by heat, cold or moisture.
- Make craftsmanlike job.
- Fully approved: Listed by Underwriters' Laboratories, Inc.
- Inspectors O.K. quickly — MILLIONS IN USE!

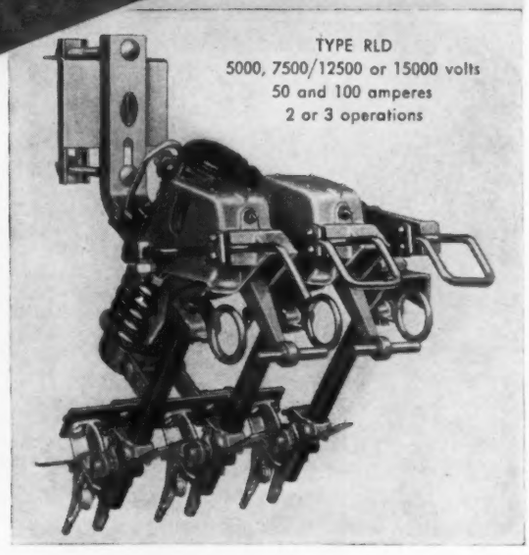
IDEAL SOLD THROUGH JOBBERS

IDEAL COMMUTATOR DRESSER COMPANY
1042 Park Avenue Sycamore, Illinois
SALES OFFICES IN ALL PRINCIPAL CITIES

You can cut distribution outages 48% TO 61%



TYPE RP2-56
5000 volts, 50 amperes



TYPE RLD
5000, 7500/12500 or 15000 volts
50 and 100 amperes
2 or 3 operations

with L-M RECLOSING FUSE CUTOUTS

Continuity of service, always important, is now becoming of still greater importance. Uninterrupted service, especially to defense industries, is an absolute "must."

Therefore, it is vitally essential that the right reclosing fuse cutouts be employed on your lines.

Exhaustive field surveys of one operating company in the Middle West*, the results of which were publicized some time ago in one of the technical journals, showed that 48% of ALL distribution circuit outages are eliminated by using two-shot reclosers and 61% are eliminated by using three-shot reclosers.

Where service continuity is maintained by using L-M Reclosing Cutouts, troubleman's trips are less, revenue continues, customers goodwill is preserved.

A check-up on your cost of troubleshooter's trips to replace fuse links, frequency of service interruptions, importance of service continuity on certain lines, will prove that L-M Reclosing Fuse Cutouts pay for themselves.

All L-M Reclosing Cutouts feature time-delay mechanisms. L-M was first with this valuable feature that reduces the chance of unnecessary fuse link blowings.

All L-M Reclosing Cutouts have only two operating positions of the cartridges, IN or OUT, there are no levers to pull, no auxiliary mechanisms to cock. Cartridges can be replaced in any sequence without momentary service interruptions.

Line Material offers you a complete range of Reclosing Cutouts, designed and built to cover the entire range of requirements. Your L-M Representative will be glad to give you complete technical information or you may write direct for it to Line Material Company, Milwaukee, Wisconsin.

**Name on request.*

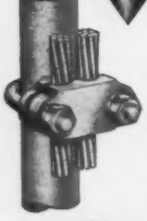
LM

LINE MATERIAL COMPANY

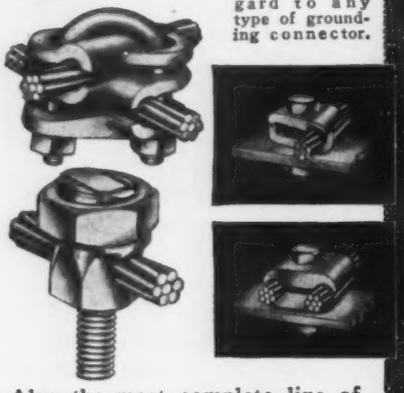
The MOST COMPLETE
LINE OF
Grounding Connectors

These pictures can only give you an idea of the variety, because —
Penn-Union makes ALL good types.
A complete line of clamps, studs and connectors for all applications. For all combinations of pipe, rod, flat bar, cable, braid, tubing.

Every one a **DEPENDABLE** unit of protection for personnel and equipment — of ample capacity, high mechanical strength, and resistant to corrosion.



Write us in regard to any type of grounding connector.



Also the most complete line of Service Connectors, Cable Taps, Terminal Lugs, Tees, and other fittings. *Penn-Union is the choice of leading utilities and industrials, contractors, and manufacturers of electrical equipment.*

KENNETH ANDERSON CO.
1855 Industrial Street, Los Angeles

NICHOLAS & COOK
1063 Howard Street, San Francisco

NORTHWESTERN AGENCIES
2411 First Ave., Seattle, Washington

Penn-Union Electric Corp., Erie, Pa.

PENN-UNION
Conductor Fittings

Induction Motors (333)

New open-type sleeve-bearing squirrel-cage induction motors designed especially for general purpose drive applications such as machine tools, pumps, auxiliary drives, and others, are being introduced by Westinghouse. These type CS motors are available in ratings from ½ to 5 hp., at speeds from 875 to 3,600 rpm, for operation on 110, 220, 440, and 550 volts, 2 and 3 phase ac. Rigid complete-cast frames maintain constant air-gap between stator and rotor, assuring high efficiency operation. Frame improvements include new sealed sleeve bearings having a combination vestibule and felt washer seal, and a larger oil reservoir capacity. Oil filler cups may be inserted on either side of the motor. Elimination of sharp corners and projections give a pleasing rounded contour. New wire insulation aims at maximum dielectric strength, toughness, and flexibility. Combination slot cells, with reinforced cuffs, protect windings from abrasion, and coil ends are taped for reinforcement against strains of full voltage starting. All motors are dynamically balanced, and windings are given a high-voltage radio frequency test.

Spirakore (334)

General Electric's distribution transformer, the "Spirakore," is now available in single-phase ratings up to and including 500 kva. Many of the larger ratings are already in production and ready for delivery. Introduced in 1937 in ratings up to 5 kva., the original Spirakore transformer featured a core assembled around the coils in two continuous, circular windings. In the larger ratings, the core is sectionalized and its shape is elliptical. The same type of cold-rolled silicon steel is used. After annealing, the steel is cut into sections which are easily assembled around the coils without imposing any damaging strain on the steel. The ends of the sections are butted together with their joints so located that the effect on the magnetic characteristics of the transformer, if any, is negligible. Thus, in effect, the continuity principle of the circular-wound core is preserved.

Overcurrent Relays (335)

High-speed overcurrent relays to shorten voltage dips and help maintain system stability have been announced by G-E. Listed as Type PJC, the new unit supersedes the the Type PHC relay.

Both compactness and appearance have been improved. Wide calibrating range and high overload capacity make the relay easy to apply. A feature of the new unit is its low burden, made possible by careful design of the magnetic circuit and moving assembly. A high dropout of 90%, continuous and stepless adjustment, and convenient resetting are other features.

The relay is a single-phase unit, 2½ in. wide, 5 in. high, and 4½ in. deep, with removable studs. Base and cover are of moisture- and acid-resistant Textolite. A glass-front cover, seated against a gasket in the base, provides protection against dust.

Fluorescent Fixture (336)

For commercial and interior lighting Hygrade Sylvania Corp. has brought out a new 200-watt Miralume fluorescent lighting fixture with plastic diffusing panels and bottom louvers. It contains four 40-watt fluorescent lamps either in daylight or white, is 49 in. long, 14½ in. wide, 7½ in. high, weighing approximately 45 lb. The fixture is sold complete with lamps.

JEFFRIES

TRANSFORMERS

BUILT TO ORDER IN A HURRY!!

When you are installing or re-arranging—and need a special transformer to exactly match your requirements—call on us. We can deliver in a week to 10 days.

Specify scattered transformers to eliminate duplicate conduit runs and save on power costs.

JEFFRIES TRANSFORMER COMPANY
1710 E. 57th St. Los Angeles, Calif.

For Better Service—
INSTALL TRICO
REG. U.S. PAT. OFF.

RENEWABLE FUSES
With the famous Powder-Packed Element

KLIPLOK CLAMPS
Lock fuses and clips together

KANTARK FUSES
With genuine fibre tubes (not paper)

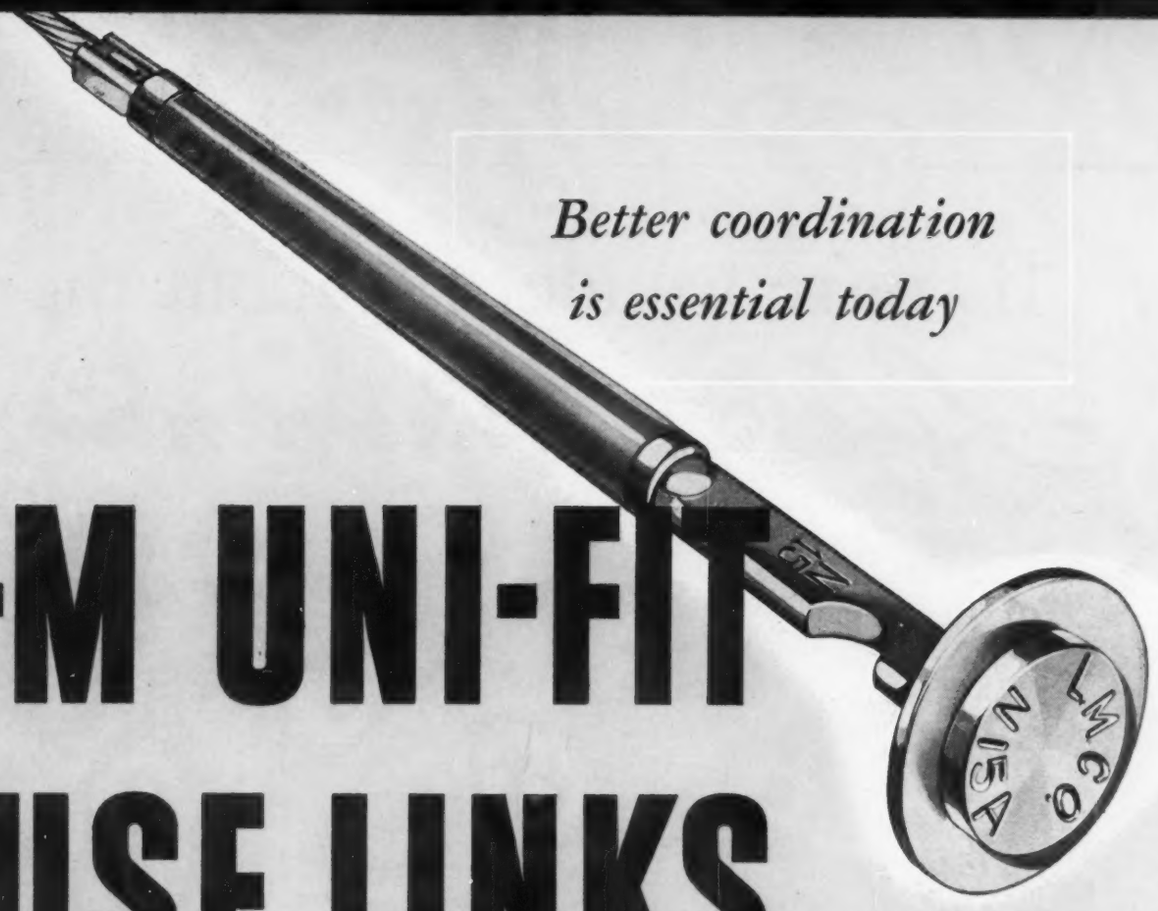
COLORTOP PLUG FUSES
The color tells the size

FUSE PULLERS
Pull and replace fuses safely

OILERS
Glass and Unbreakable types for every application. Stops guesswork - bearing failures- waste- idle machinery, etc.

WRITE FOR FOLDER No. 300

TRICO FUSE MFG. CO., Milwaukee, Wis.
M. L. Woodard, 367 9th St., San Francisco
W. E. Young Co., 1944 Broadway, Denver



Better coordination is essential today

L-M UNI-FIT FUSE LINKS will provide it

Today, satisfactory operation of modern distribution systems depends on satisfactory fuse link coordination.

With urban and rural distribution becoming more complex, fuse link coordination problems become more difficult.

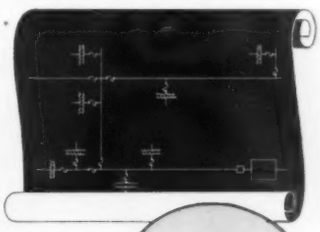
L-M UNI-FIT Fuse Links are built for modern coordination.

They are built to close-tolerance accuracy with resultingly high uniformity in blowing time. They are particularly applicable where fuse link coordination is critical.

In L-M UNI-FIT Fuse Links the fusible element is closely calibrated and checked for length and diameter, individually tested for uniform resistance. They are available in either pure silver or pure tin, die cast in the larger sizes by exclusive process for greater uniformity and to eliminate the "human element".

L-M UNI-FIT Fuse Links can be used with practically every kind and make of cutout now in service. They are particularly advantageous with cutouts of the dropout design because their lower leader, of especially flexible copper braid, assures proper operation of the dropout mechanism.

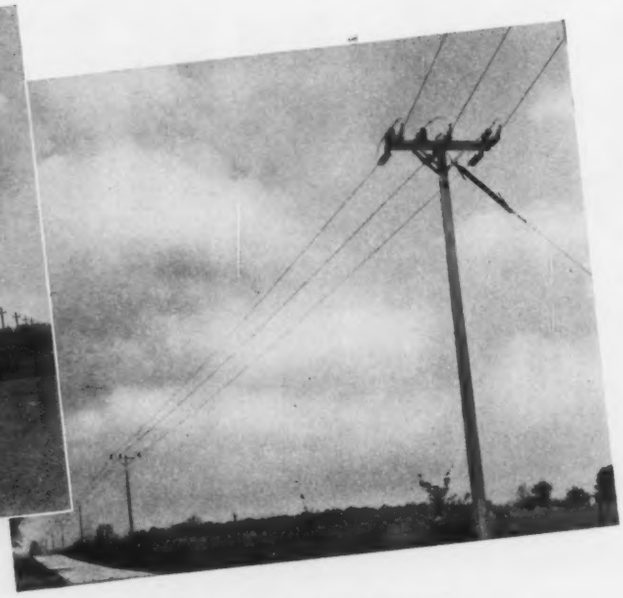
The simple L-M Coordination table No. 10406 makes reliable fuse link coordination an easy task. This table, one of the most complete, gives separate values for single or reclosing cutout fusing to allow for the different conditions. The L-M representative will be glad to furnish you with copies or you may want to write for them to Line Material Company, Milwaukee, Wisconsin.



LINE MATERIAL COMPANY

If you're wondering about the *Life of Aluminum*

The lower arm once carried heavy Aluminum trolley feeders; now carries the power dispatcher's line.



Marion-Reserve Power Company's new A.C.S.R. transmission line.

DEFENSE COMES FIRST

To meet the needs of the National Defense Program, plus the normal demands of peace, a vast expansion of our already greatly increased production capacity is being speeded. When the emergency is past, there will be more Aluminum available than ever before.

Meanwhile, if you can't get all the Aluminum you want when you want it, remember Aluminum is helping you by helping to meet the National emergency.

There's a wealth of evidence that Aluminum conductors are good for the life of a line. The old line pictured here, for example—

Installed in 1905 to supply power for an interurban railway, this line is on the job today—36 years later—as an important link in a power company's distribution system. Though outmoded in design, its Aluminum conductors are good for many a year.

Contrast this old construction with the newest on this same property. Modern in every respect, its conductors are also Aluminum, long-lived like their predecessors, but reinforced to give the high strength required by long spans. They're A.C.S.R.! ALUMINUM COMPANY OF AMERICA, 2132 Gulf Building, Pittsburgh, Pennsylvania.

ALCOA ALUMINUM

A·C·S·R

Aluminum Cable Steel Reinforced

FOR HIGH VOLTAGE TRANSMISSION and RURAL POWER LINES

WE BROKE WITH TRADITION TO BUILD THIS NEW MOTOR

TRI CLAD INDUCTION MOTOR GIVES EXTRA PROTECTION 3 WAYS

Integral-hp motors through 20 hp (at 3600 rpm) sizes, open or splashproof construction, are now available.

1 Extra Protection AGAINST PHYSICAL DAMAGE

One-piece cast-iron frame and cast-iron end shields protect the vital parts—from external blows, falling objects, or dripping liquids—keep them safe and secure even under slam-bang conditions.

2 Extra Protection AGAINST ELECTRICAL BREAKDOWN

Stator winding of Formex wire gives extra protection against moisture, oil abrasion, and heat-aging. New synthetic-resin bonding varnish and Glyptal No. 1201 red on end windings make a sturdy unit with a durable finish.

3 Extra Protection AGAINST OPERATING WEAR AND TEAR

Sleeve bearings are of new design, and have a method of grooving that assures a continuous oil film over the entire bearing surface. A new and simple ball-bearing mounting assures correct alignment and exclusion of foreign materials.

OUR field studies had shown that, more and more, the requirements of industry were demanding a vastly improved general-purpose motor, and it was apparent that this demanded a radically new approach on the part of the designer. Only by matching up *all* the new wants and *all* the new ways of doing things, in a supreme effort to make a *long jump* ahead—instead of the traditional *step* ahead—was it possible to achieve this truly modern motor.

And now you have the Tri-Clad motor—a completely new design. Because so many major improvements have been concentrated in one motor, we had to have just that much more assurance that each one was thoroughly practical. Never before, we believe, has the manufacturer required a motor to prove itself so thoroughly in advance of initial sale.

Whatever the task you have for a general-purpose motor—whatever your special concern for appearance, convenience, quietness, *or* protection—you will find that the performance-tested features of the Tri-Clad motor will give you specific benefits on the job. General Electric, Schenectady, N. Y.

GENERAL ELECTRIC

750-38

IN 1941 FRIGIDAIRE DEALERS ARE CASHING IN ON AN EVEN GREATER

Leadership in Action

✓ All-time high in Sales!

1941 sales to date are biggest in history—ahead of the 1940 record-breaking pace that reached over 625,000 units.

✓ Greatest production in history!

Even at this early date, the Frigidaire refrigerator factory, world's largest, is producing at a FASTER pace than the all-time record of 1 refrigerator every 17½ seconds manufactured during last year's PEAK SEASON.

✓ Greatest products in history!

Inside and out, the 1941 Frigidaires are the most brilliant ever built... a fact that has been proved by unprecedented nation-wide public acceptance. New Beauty! Usefulness! Economy and Value again make Frigidaire the hottest line in the industry!

✓ Greatest Sales Program ever!

Again in 1941 Frigidaire leads with the most intensive advertising and practical sales plans in the industry. Only an organization with Frigidaire's experience and record of Leadership in Action could provide a program so effective in meeting each dealer's needs and increasing his sales leadership in his community.

FRIGIDAIRE DIVISION • General Motors Sales Corporation, Dayton, Ohio
Frigidaire Electric Appliances • Refrigerators, Ranges and Water Heaters

MORE THAN EVER IT PAYS TO

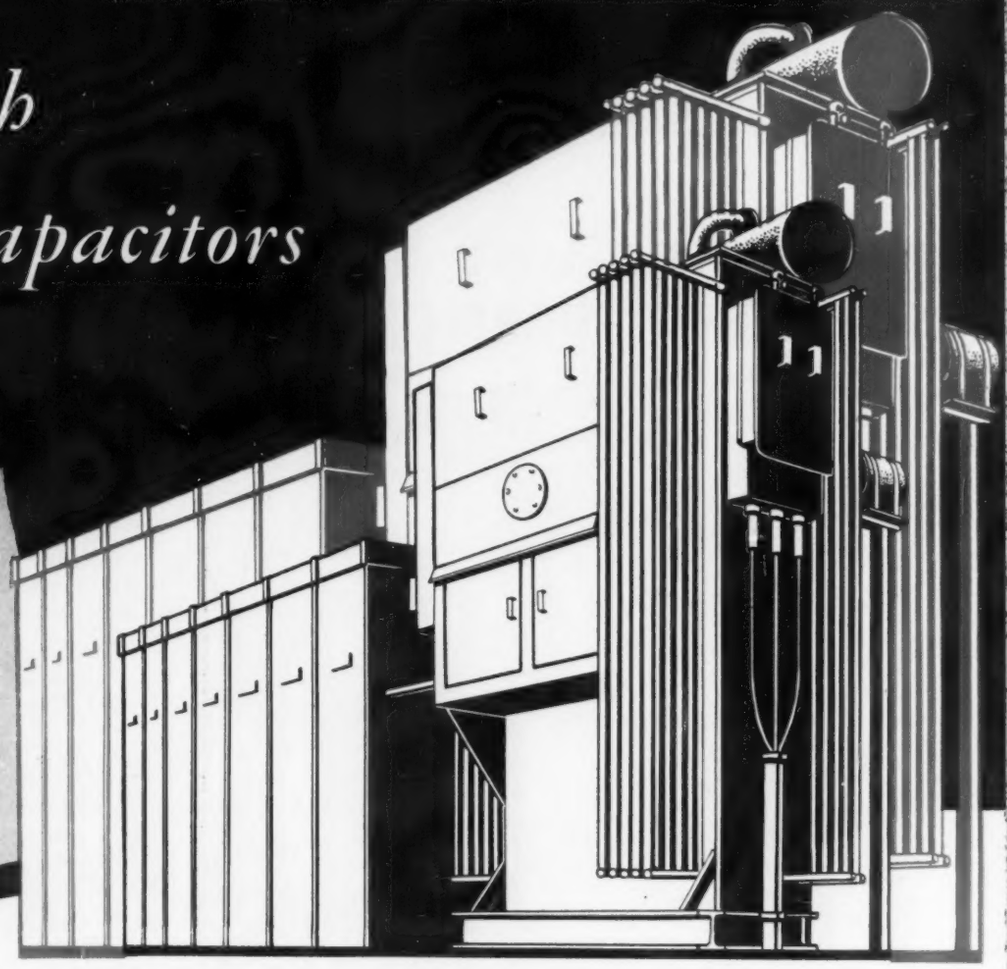
Sell the Favorite— Sell Frigidaire

Over 6 million built and sold!

"*Enlarge*" Your Substations

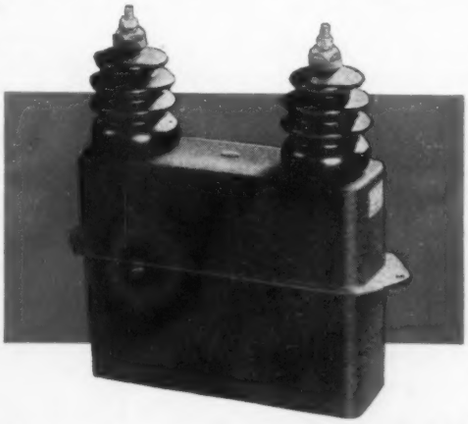
with Pyranol Capacitors

IT'S THE QUICKEST WAY TO GAIN CAPACITY—AND THE COST IS LOW



EIGHTEEN hundred kva of substation capacity *obtained for only $15.84 per kva.* That's one electric service company's experience with G-E Pyranol capacitors. Another reports a gain of *206 kva* of substation loadability after installing *only 360 kva of Pyranol capacitors.* A third tells of using them to boost capacity in all substations *from 10 to 30 per cent.* And if your equipment is overburdened with low-power-factor loads, you can make a similar "expansion."

Pyranol capacitors are easy to install—and equally important, they're easy to relocate when loads change. They're available for service anywhere—indoors or out—in banks of any required rating. Moreover, you can get them quickly—most standard ratings are shipped right off the shelf.



In preparing for growing loads, don't overlook valuable capacity already installed. Make it available by neutralizing reactive kva—by improving power-factor with Pyranol capacitors. Your G-E representative will be glad to give you further information—including a quick estimate of the added capacity and savings possible with Pyranol capacitors.

Ask for Bulletin GEA-3333, General Electric, Schenectady, N. Y.

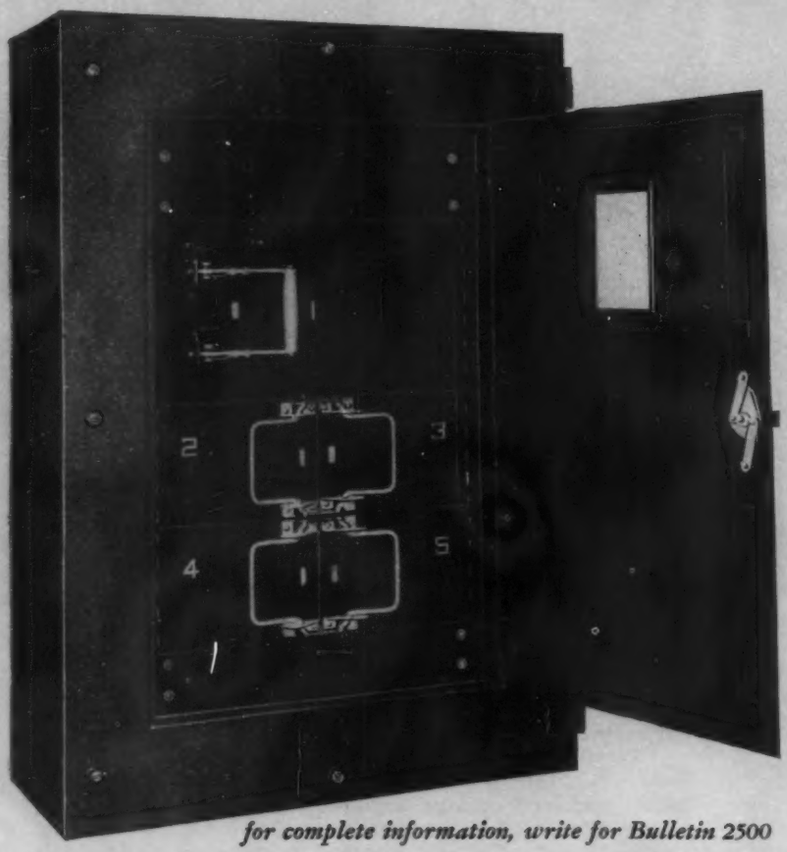
GENERAL ELECTRIC

407-17

SQUARE D

Saflex DISTRIBUTION PANELBOARDS

FOR SAFETY AND FLEXIBILITY IN CONTROLLING ELECTRIC SERVICE AND FEEDERS SUPPLYING CURRENT FOR POWER, HEAT AND LIGHT



for complete information, write for Bulletin 2500

Saflex units are safe to operate. No live parts are exposed and all circuits may be opened safely under maximum load. The double break switch jaws are visible for inspection when the unit door is open. The switch blade assembly is the only part carried on the permanently anchored door. All poles are broken simultaneously with no possibility of causing single phasing. Rotary switch blades are provided on all units except 600 ampere size. The cabinet doors are equipped with Yale cylinder locks which prevent unauthorized access to the panel. The box has over-size wiring gutters.

The interior, front and box are separate units. Thus, the box can be shipped alone and roughed-in during the early stages of construction, with the interior and front following at a later date.

Today, when speedy delivery is often a vital factor, it is important to know that Saflex panelboards can be furnished promptly.

Built to "Take It"!

The exceptional simplicity and sturdiness of design and construction of Saflex switch units is shown in the lower illustration. These units, ranging from 30 to 600 amperes, are for use in systems up to 575 volts A. C. or 250 volts D. C.

A The switch unit door can be locked in either the ON or OFF position by means of a padlock on the bracket.

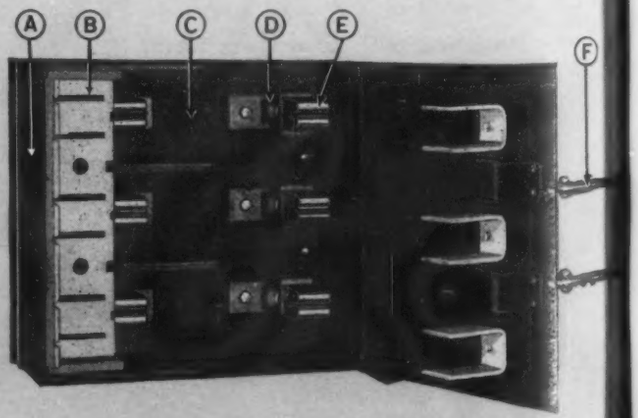
B Arc suppressor block greatly increases the rupturing capacity.

C Shatter-proof insulating base is mounted in steel box for maximum mechanical protection. No molded parts are exposed when door is closed.

D Solder-solderless lugs can be used either as solderless connectors or as solder lugs or both. They are furnished on all units except 30 ampere, 250 volt units.

E Positive pressure fuse clips have high conductivity and assure automatic contact pressure at the fuse terminals without auxiliary parts. This important feature eliminates clamping screws or parts which might not be sufficiently tightened or which might become loose due to vibration or temperature variation.

F Cam-action is provided by handles near switch jaws where it is most needed. This cam-action supplies (with minimum manual effort) the considerable force necessary to provide high contact pressure.



SQUARE D EQUIPMENT IS AVAILABLE THROUGH ELECTRICAL WHOLESALERS—EVERYWHERE

SQUARE D COMPANY

LOS ANGELES - MILWAUKEE - DETROIT

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

Cook better for less!

CHROMALOX
RANGE UNITS

Sell low-cost cooking with ranges equipped with these units. And sell fast cooking, too! Chromalox units cook food as fast as food will cook. Easy to clean—just wipe off the flat top. Nothing to take apart.

Use Chromalox Units for replacements—they fit all ranges. Write for new book, "How to Sell More Ranges."

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911 Western Ave., Seattle, Wash.
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420 S. San Pedro St., Los Angeles, Calif.
THE PETERSON COMPANY
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Give You Greatest Flexibility in Floor Box Applications

A floor outlet for any type of floor construction.

LEW Floor Boxes and Fittings manufactured since 1930 are credited with being the finest made.

A TRIAL WILL CONVINCE YOU

Complete stock carried in Western Warehouse

CALL or WRITE

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—LOW VOLTAGE GENERATORS
BARTLETT TREE TRIMMING EQUIPMENT
METER JEWELS
BIERCE CONE ANCHORS
—GUY WIRE GUARDS

Glowing Pictures (337)

Magic pictures that glow in the dark after they have been charged by the energy of ordinary lamp bulbs, are offered on the novelty market by Drug Leaders, Inc., 610 Folsom St., San Francisco, distributors for Glowbrite Laboratories of 129 Tehama St. The latter laboratories have developed a number of phosphorescent and fluorescent paints which, when applied to signs or illustrations, will absorb an energy charge from ordinary daylight or incandescent lamps and continue to glow for several hours after the lights are extinguished. Particularly significant, perhaps, will be such paints in case of "blackouts." Similar applications to driving gloves for motorists and for applications in connection with "black" or ultra-violet light constitute other uses. The magic pictures at present are used for nursery and home decoration.

Industrial Furnaces (338)

Improved furnace design for heat treatment of aluminum and magnesium alloys is claimed by Despatch Oven Co., of Minneapolis. The unit is said to improve tensile strength and elongation factor by reason of temperature uniformity, given at 5 deg. plus or minus when operating at 950° F. Contributing to this is the method of air circulation which provides an air velocity through the furnace exceeding 20 mi. per hr. The furnace draws 100 kw. for the first 2 hr. of preheating and tapers off to 25 to 30 kw. during the soaking period. Recirculation is almost 100%.

Rheostats (339)

A new 500-watt rheostat has been announced by Hardwick-Hindle Inc. The feature of this design is that it permits a tandem assembly which is unusually compact and requires no increase in overall diameter. Depth of two units in tandem behind the panel is only ⅜ in. greater than that of two single rheostats. Furnished in a variety of resistances, it is for such applications as lamp dimming, and motor, generator fields and electronic tube control.

Low-Priced Ironer (340)

A new model low-priced ironer has been developed and placed on the market by Altorfer Bros. Co. Equipped with a 26-in. roll, rust and scratch proof shoe, 3 point suspension of the shoe for uniform contact and pressure, full open end, sealed-in self feeding lubricating system, both fingertip and knee touch control, combination switch and thermostat, and with a table top cabinet. The ironer requires a floor space of 17½x36 in. and is finished in white enamel.

Spring Clips (341)

Spring clips manufactured by Monarch Fuse Co. are designed to minimize contact resistance between clips and fuses or switch blades, to reduce arcing, etc. A small pamphlet has been published which sets forth details concerning ratings and price.

Laytex Wire (342)

"The Dawn of a New Era for Electrical Wires" is the title spread across a large (11x14-in.) plastic-bound brochure issued by U. S. Rubber Co. to tell the story of its U. S. Laytex small-diameter branch-circuit building wire. In pictures and text, it describes the market opportunities for the use of this wire for contractors and wholesalers.

G.C.A.
Lamp Replacers
Lamp Base Removers
Cartridge Fuse Tongs
Switch Hooks

Send for Catalogue
We have been making safety tools for 24 years

THE G. C. A. Manufacturing Co.
Pittsfield, Mass.

ELECTRICAL TESTING LABORATORIES

Electrical Photometrical, Chemical and Mechanical Tests. Inspection of Materials and Apparatus at Manufactory.

2 East End Ave. New York

THE WEST GROWS FASTEST

The West is the region where: One-tenth of the nation's people use one-fifth of the nation's electricity; Electric rates are the lowest in the world; Great natural resources (involving 40% of the nation's area) await exploitation. Census data bear out the statement that the West is the fastest-growing electrical market. For further information about this big, fast-growing market, and how to reach it, call an ELECTRICAL WEST representative:

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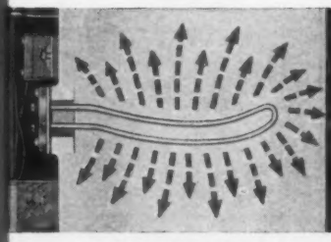
NOW... FAMOUS WESTINGHOUSE QUALITY

AT THE LOWEST PRICES IN WESTINGHOUSE HISTORY!

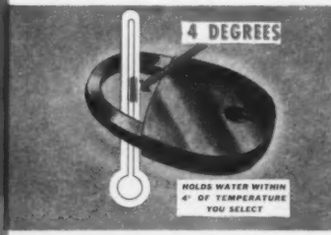
NEW "SPECIAL" MODELS

WITH THESE DELUXE SALES MAKING FEATURES



COROX ECONOMIZER HEATING UNIT

Famous for dependability. 99-75/100% of more than ¼ million Corox Units made in 12 years are still in operation!



SUPER ACCURATE THERMOSTAT

Automatically keeps water within 4° of temperature selected. Withstands tests equal to 51 years of trouble-free service in the home.

Plus *Improved Palco Fibre "A" Insulation, Scientific Baffle,* and many other quality features formerly found only on higher priced heaters!

FOR *BIG VOLUME* SELLING!

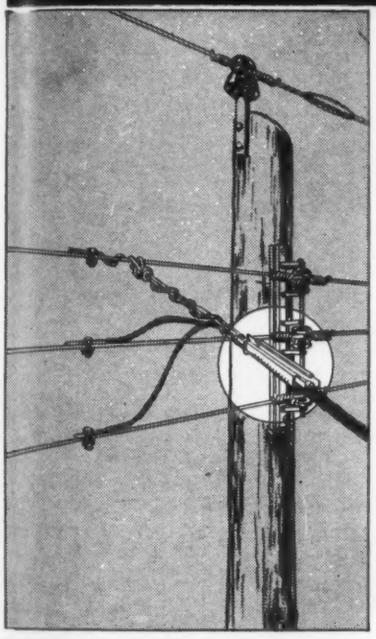
Yes! The "SPECIAL" is a NEW campaign model designed for *fast turnover!* Look at the selling "edge" it gives you: Famous Westinghouse quality features formerly found only in higher priced heaters . . . The sales making value of the "name that means everything in electricity" . . . plus new LOW PRICES that mean greater sales, higher profits this year.

Get details from your Westinghouse Distributor. See how the "SPECIAL" fits into the Westinghouse Line to give you a heater for every market requirement. Westinghouse Electric & Mfg. Co., Merchandising Division, Mansfield, O.

Westinghouse *Electric* Water Heaters

FROM THE *Leisure Line* OF ELECTRIC HOME APPLIANCES

modernize
YOUR
DISTRIBUTION
PRACTICE—



Residential area construction—showing single phase primary with attachment of service cable a couple of feet from pole to high strength common neutral wire.

RELIABLE
CONCENTRIC
CABLE CLAMPS

hold cable securely without bending or snubbing or otherwise damaging the insulation. Non-corrosive materials—easy to install—low in cost.

Reliable
ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES
[illegible] CARROLL AVENUE • CHICAGO, ILLINOIS

BULLETINS

data books, etc.

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Your being right up-to-the-minute may have an important bearing on your success. New developments are appearing daily in your field—tools to help you do a better job. Are you abreast of them? You fall back a step when the other fellow is well informed about a subject of which you are ignorant. Manufacturers' publications are a quick, efficient way for you to keep posted on current events in your field.

Isn't it a bargain to invest 1c (the cost of a postcard) to help earning power to which you look forward? American industry is offering a remarkable service—free. ELECTRICAL WEST makes it easy for you to enjoy this service for your own. Check and mail the coupon below. That's all you have to do to help yourself toward better performance and greater rewards.

Metalclad Switchgear (301)

General Electric's description of its bulletin GEA-2499A is that it will, in 10 min., give you the most important facts about master metalclad switchgear. This squares with the booklet itself, an attractive, 32-p., 2-color presentation of installations up to 15-kv., with numerous illustrations, detail drawings.

Oil Breakers (302)

Roller-Smith oil circuit breakers are described in two new catalogs. Both carry a great deal of detail. No. 3940 deals with manually-operated underground units, 200-400 amp., 7,500 volts; No. 3650 with outdoor units, 600 and 1,200 amp., 15 and 23 kv.

Insulators, etc. (303)

A thoroughgoing catalog for those concerned with insulators, bushings and their associated hardware is No. 24, just published by Ohio Brass Co., presented in a bound volume running 159 pages.

Lighting Units (304)

Just about anything you might want to know about Permaflectors is told in Pittsburgh Reflector Co.'s Catalog No. 40, and that pretty well covers the industrial and commercial fields, both indoors and out. There are 112 pages of drawings, descriptions, light distribution curves. etc., and a "quick-selection" index to help you find what you're after.

Lead Cable (305)

To explain the nozzle-swirl process of applying lead sheath on paper cable, G-E has produced no less than three bulletins. What nozzle-swirl is set forth briefly, graphically in GEA2968; 17 safeguards in the lead press are reviewed briefly in GEA2992, and in detail in GEA3394.

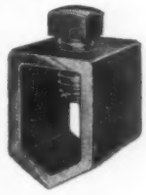
S
Sherman
CONNECTORS

Sherman solderless wire connectors and clamps are practical, efficient, easy to install, and surprisingly moderate in cost. Every item has been designed and built to meet the specific needs of the Electrical Industry.

You can cut costs and reduce inventories by standardizing on Sherman. Prompt deliveries from large stocks.

Today's finest Split Bolt Connector. Precision machined from high strength corrosion resistant bronze.

Wedge Grip Connectors that provide extra wedging and snubbing action. Pure copper, non-removable screw.



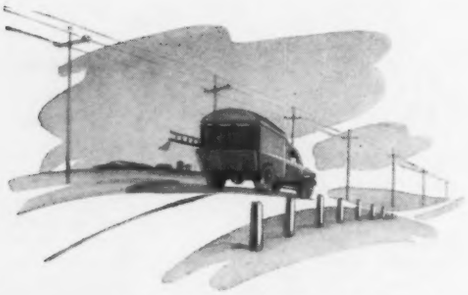
The popular "Bond-Rod" ground clamp for driven ground rods. Heavy extruded bronze. Bronze screw with cup point. Strong one-piece construction.

Heavy ribbed parallel groove clamps for jumper, tap-off, service or other wire connections. Made in a range of types, for Copper, ACSR or Galvanized Steel Strand connections.

New type Armor Rod Clamp for making tapoffs over ACSR Armor Rods. Unique interlocking construction. Quickly installed without removing bolt.

Free New catalog and samples

H. B. Sherman Mfg. Co.
28 Barney Street
Battle Creek, Michigan



If you're one of the engineers who has taken it for granted that there'd always be a certain amount of trouble with transmission line and station insulators, you owe it to yourself to investigate the proved operating advantages of Lapp Line Post and Station Post insulators.

Lapp

LAPP INSULATOR COMPANY, INCORPORATED • LE ROY, N. Y.

Conduit Fittings, etc. (306)

Racolet is the trade name for a line of malleable iron bodies in standard and FS types, produced by All-Steel-Equip Co. List prices and Details on both threaded and threadless bodies for various types of conduit, on fittings, covers, etc., are set forth in a new catalog.

Fans (307)

Wagner Electric Corp. is already out with its 1941 dealer sales manual on fans and other ventilating equipment. In addition to details on the full line, the 20-page catalog also gives useful installation and application data.

Network Protector (308)

Full information on the G-E heavy-duty automatic network protector for secondary systems is set forth in G-E's bulletin GEA-2017B, containing 16 illustrated pages.

Centrifugal Relay (309)

Centrifugal-speed relays, for speeds of 70 to 4,000 r.p.m., either automatic or manual reset, are told about in G-E bulletin GEA-3047A.

Photometers (310)

Lighting engineers and others who rely on precision methods in Lighting will find a great deal of information on photometers and accessories in Leeds & Northrup catalog E-72.

High-Frequency Tools (311)

Industrial men who may want reference information on high-frequency electric tools will be interested in 19 new models shown in the new 1941 Thor catalog.

Transformers (312)

Allis-Chalmers has released a new distribution transformer bulletin B-6125 covering sizes ranging from 37½ to 200 kva. designed for standard voltages of 2,400 to 69,000 volts. The 16 well-illustrated pages cover the design and construction features, including dimension sheets.

Rubber-bladed Fan (313)

Samson-United Corp. has streamlined its Safe-Flex rubber-bladed fan, included in its line a 10-in. unit for table use or wall mounting and has available a 2-page illustrated catalogue sheet No. 4061 describing the line.

Glass Cloth (314)

A folder, containing samples, and describing Irvington Varnished Fiberglas, giving technical data and specifications of available tape widths and standard roll lengths is offered by Irvington Varnish & Insulator Co.

Distribution Transformers (315)

Distribution transformers in the 1½ to 100 kva. range are illustrated and described in bulletin No. 112 just issued by the R. E. Uptgraff Manufacturing Co.

Air Conditioning (316)

Carrier Corp. calls its 16-p. catalog AC-138 "the most complete index of air conditioning, refrigeration and space heating equipment and services ever compiled." A broad statement, but the booklet does pack in a whale of a lot of information, with illustrations, on 55 types of equipment, reprints revised psychometric charts, arranges all for quick reference.

DC Voltage Regulator (317)

A 4-page Allis-Chalmers bulletin (B-6137) covers briefly and with good illustrations the rocking contact voltage regulators for DC machines.

EASY WAY TO GET INFORMATION

To keep posted, simply circle the items in which you are interested. cut out the coupon (it can be pasted on the back of a postcard) and mail to:

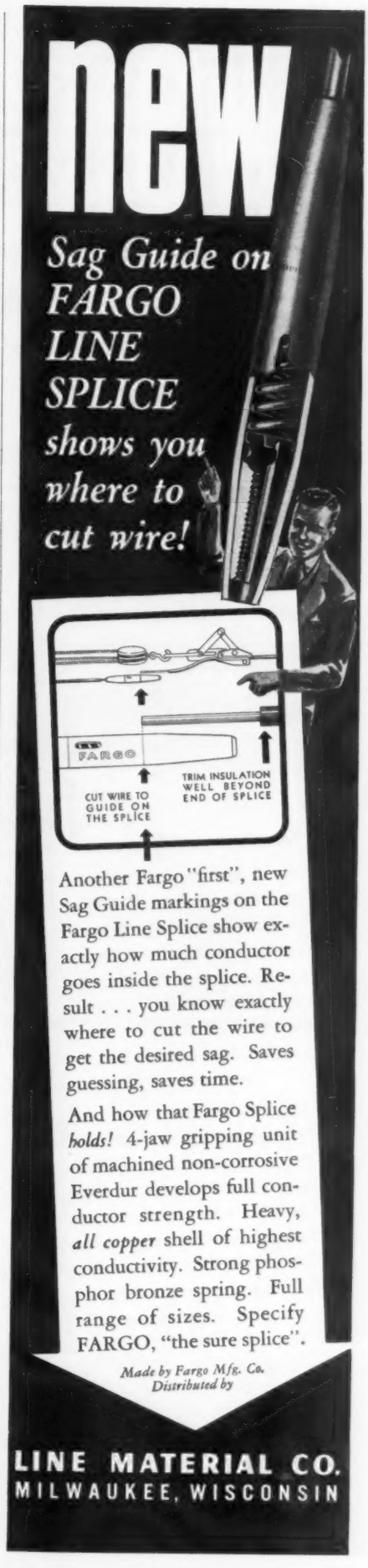
ELECTRICAL WEST, 68 Post St., San Francisco, California
Please send me the following CIRCLED items:

301	302	303	304	305	306	307	308	309	310	311
312	313	314	315	316	316	318	319	320	321	322
323	324	325	326	327	328	329				

Name..... Company*..... Title*.....

Address

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.


new
Sag Guide on FARGO LINE SPLICE shows you where to cut wire!
FARGO
CUT WIRE TO GUIDE ON THE SPLICE
TRIM INSULATION WELL BEYOND END OF SPLICE
Another Fargo "first", new Sag Guide markings on the Fargo Line Splice show exactly how much conductor goes inside the splice. Result . . . you know exactly where to cut the wire to get the desired sag. Saves guessing, saves time.
And how that Fargo Splice holds! 4-jaw gripping unit of machined non-corrosive Everdur develops full conductor strength. Heavy, all copper shell of highest conductivity. Strong phosphor bronze spring. Full range of sizes. Specify FARGO, "the sure splice".
Made by Fargo Mfg. Co.
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Made only by DRIVER-HARRIS COMPANY

Stocked for the Coast Trade at

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235-241 San Bruno Ave.

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ANGUS-CAMPBELL, INC.

SMOOT-HOLMAN COMPANY
Pioneers of Lighting in the West

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SMOOT-HOLMAN COMPANY
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INGLEWOOD CALIFORNIA

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41 Post Office Place,
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G. S. SPANGLER
618 Colorado Bldg.,
Denver, Colo.

TORK CLOCKS

THE POPULAR TIME SWITCH LINE KNOWN EVERYWHERE

NOW—lower prices and higher capacities

There is a Tork Clock for every regular switching job; 60 minute, 4 hour or daily cycles.

Bulletins on request

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QUALITY CARBON BRUSHES
for
MOTORS AND GENERATORS

Catalogs on request
Stocked at:

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Los Angeles, Calif.
225 W. Pico Blvd.
PRospect 2523

Seattle, Wash.
166 Jackson St.
Elliot 3582

MAGAZINES
in quick review

For Distribution Men

Distribution engineers who have not already done so should have themselves put on the mailing list for *Distribution*, a magazine published quarterly by G-E. Each issue contains four or five major articles which are right up the alley for distribution men as well as miscellaneous distribution notes, helpful tables, etc. In the January issue, for example, are articles on "Shunt Capacitors on Two-Phase Systems," "Burn-off Characteristics of AC secondary Network Cable," "Is it Good Operating Practice to Change All Fuse Links When One Blows?"

Capacitors

"Traveling Capacitors Are Versatile Tool," *Electrical World*, February 8, p. 66. An article describing in some detail the design of a trailer in which Pennsylvania P & L Co. mounts capacitors so it can move them about the system as needed.

System-Wide Regulation

"Voltage Control Extends from Bus to the Outlet," *Electrical World*, Feb. 8, p. 72. An overall discussion of the voltage regulation problem arguing the point that interior wiring should bear its share of scrutiny along with primaries and secondaries.

What Happens When Bombs Fall?

"Electric Utilities Under War Conditions," *Electrical Engineering*, February, p. 67. This is a discussion by an official of a European company describing how utilities are able to function in times of war, based on actual experiences, and how they are able to follow long-range planning even after war has broken out.

Two Phases of Contracting

"Effects of Intermittent Employment Under the California Unemployment Compensation Act", by J. W. Collins, secretary Electrical Contractors' Assn. of Chicago, and "What Do You Offer Your Customer", by Ray Ashley, research engineer of the same organization, are two particularly revealing articles in the January 1941 issue of Qualified Contractor.

And Two More

How electrical contractors should proceed in handling of complaints respecting their ability to place bids in the national defense construction program is described in *Qualified Contractor* for February, p. 14. Col. O. R. McGuire, NECA general counsel at Washington, D.C., tells the procedure. The same number describes an employer-employee pension plan adopted in New York City.

A Vigorous Wiring Idea

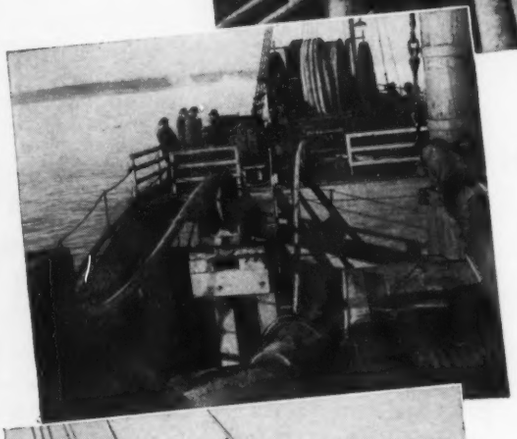
"For Unlimited Raceway Capacity" in the February *Electrical Contracting*, p. 15, describes wiring technique with the new cellular metal floor raceways. "Ten million homes to wire this way" by Editor Earl Whitehorne challenges contractors and power companies to a mass production attack on the re-wiring of the millions of poorly wired homes in existence.

From the EEI

"TVA—1940" *Edison Electric Institute Bulletin*, Jan. p. 14. The clear-eyed scrutiny of William M. Carpenter, economist of the EEI, reveals some startling discrepancies between the claims of profitableness of TVA and reality. "Selling Tips for 1941" by E. E. Greenwood, commercial director, gives good advice on the sales and merchandising situation for utility people facing the uncertainties of 1941.

NO JOINTS IN 22,000 FEET of OKOLITE SUBMARINE POWER CABLE

Puget Sound Light and Power Co. Installation Increases Bremerton District Power Supply



Installed to supplement two Okonite submarine cables laid in 1926 and still operating perfectly, this new 23000 V. Okolite insulated non-leaded Submarine Power Cable was made, shipped and installed in a single length.

Materials and specifications for construction were as follows:

DESIGN: 3 conductors, 250,000 C. M. 61 strands .0640 Okoloy-coated copper wire, 29/64" Okolite insulation, each conductor taped, cabled together with double wrapped tape binder, 2 layers saturated jute, #4 B.W.G. galvanized steel tape, 5/64" saturated jute.

OVERALL DIAMETER: 4.38 inches.

WEIGHT: Over 15 lbs. per foot.

TOTAL WT. OF CABLE: 354,000 lbs.

Total capacity provided by these cables will be ample to take care of immediate needs and allow for added loads in the future.

THE OKONITE CO., PASSAIC, N.J.
Offices in principal cities

OKONITE

OKONITE

RUBBER INSULATED WIRES AND CABLES

Postal

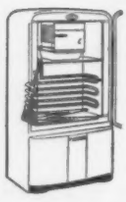
ELECTRIC APPLIANCE RETAILERS, U. S. A.

REVOLUTIONARY NEW

ALL RECORDS . . MOIST-

OF TOTAL SALES AND

As an Essential Feature of Kelvinator's Long-Range Program—Kelvinator Refrigerators and Ranges are Manufactured by a "Retail-Minded" Organization—they are Manufactured to Sell!



A major point in Kelvinator's program of planned and organized manufacture and distribution is its attitude toward *product*—either refrigerators or ranges.

Kelvinator refuses to be complacent. It realizes that successful appliance selling is based on sound change.

Kelvinator calls this attitude "retail-mindedness."

Typical of this retail approach to *product* is the 1941 Kelvinator Moist-Master—the outstanding product achievement of the year and a powerful incentive for the replacement market.

It *looks* different—and it *is* different.

In addition to the High-Speed Freezer, a separate set of refrigerating coils are concealed within the walls. Humidity is controlled throughout the cabinet. A glass-enclosed Cold-mist Freshener provides super-moist refrigeration for left-overs and vegetables.

Already the Kelvinator Moist-Master accounts for over 20 per cent of all sales.

It pays to tie up with a "retail-minded" organization.

Telegraph

KELVINATOR MOIST-MASTER BREAKING MASTER SALES ALREADY ARE OVER 20% ARE MOUNTING STEADILY.

Check These Kelvinator Franchise Advantages Against Any Other

1 EXCLUSIVE EXTRAS... No other refrigerator offers the exclusive new Magic Shelf—the Stainless Steel Cold-Ban—the Glass-enclosed Cold-mist Freshener cooled by coils within the walls of the refrigerator. And the 1941 Kelvinator Ranges offer new, exclusive features at the lowest prices in history.

2 STEP-UP PLAN... A *logical* step-up plan based on the actual retail *value* of each added feature. The *higher* priced models, in both refrigerators and ranges, are easy to sell.

3 NEW LOW PRICES... Last year Kelvinator's new price policy revolutionized the industry. This year, step number two in our long-range program reduces refrigerator and range prices even farther, and greater values have been built into every model in the line.

4 HIGH UNIT SALES... Last year the average of 80 per cent of all Kelvinator retailers' sales was $160—which we believe sets an industry record. With this year's amazing step-up plan Kelvinator retailers will again sell an overwhelmingly big per cent of higher-priced refrigerators and ranges.

5 SIZE... One of Kelvinator's most important *extras* is size. Six cubic foot refrigerators are now six and three-quarter cubic feet—and eights are eight and three-quarter cubic feet—thanks to Kelvinator's new cabinet construction. And all ranges have big, *oversize* ovens.

6 SELECTIVE MARKETS... Kelvinator's 1940 policies, carried forward into 1941, have earned for Kelvinator the reputation of putting into actual practice—"a market for every dealer—a dealer for every market".

7 FEWER MODELS... By concentrating on the models people really want, Kelvinator has reduced its refrigerator line to *nine* models—its range line to three—and thus reduced the retailer's investment to a minimum and simplified his selling problem.

8 SERVICE-FREE... The Polarsphere Sealed Unit has set a record for reliable performance. Of the hundreds of thousands of Kelvinator refrigerators sold last year, less than one-half of one per cent were returned to the factory for service.

9 REPLACEMENT SALES... The new and radically different 1941 Kelvinator Moist-Master with its glass shelves and Cold-mist Freshener, offers the most powerful replacement incentive in years. And every 1941 Kelvinator is a *brand new* model. Not one is a relabeled carry-over from 1940.

10 ADVERTISING AND PROMOTION... The biggest campaign in Kelvinator's history is already under way with four-color magazine advertising—key city newspaper and transcribed radio spot announcements—new style billboard posters and complete cooperative advertising materials. Selling and product literature is printed in *full-colors*.

11 STOCKING... Kelvinator's Redisco Plan for 1941 provides the most flexible and liberal method of stocking refrigerators and ranges you have ever been offered.

12 PLANNED DISTRIBUTION AND MANUFACTURING... A long-range program developed by a "retail-minded" organization to help retailers build an increasingly profitable business.

Kelvinator Division, NASH-KELVINATOR CORPORATION, *Detroit, Michigan*

Get More—Get **KELVINATOR**

WHEN YOU SEE THE DIFFERENCE

YOU'LL KNOW WHY YOU CAN SAVE MONEY WITH G-E FORM 79'S

Most street-lighting luminaires look very much alike—on the outside. Mounted high up on a pole, a General Electric Form 79 looks very little different from the others. But what really matter are the things you cannot see and may not appreciate—what is inside the aluminum and glass you buy, and what experience is back of the product.

Look into a G-E Form 79; you will find a real difference. For example, the aluminum reflector is spun onto the globe to protect the glass edge against chipping and damage when the luminaire is being relamped. The joint that is opened for relamping is made tight, not by the use of gaskets, but because an accurately die-cast aluminum hood fits against a die-formed shoulder on the reflector. The advantages? Low glassware breakage, and freedom from loose-fitting gaskets that allow dust and insects to enter.

Only General Electric gives you the stepped reflector—the lamp-saving feature that redirects radiant energy slightly to one side of the lamp stem. Exclusive, too, is the porcelain cylinder within the slip-fitter hood which prevents severe overheating of cable and provides added insulation between the conductors and the metal hood. Tests show that the hottest point on the rubber insulation is 40 C lower with the "heat-insulating" hood.

Today more and more buyers are looking *inside* the luminaire they buy. That is why more and more are buying G-E. When you need luminaires, don't base your selection on outside appearance only. Look inside—and you will want your next installation to be General Electric. *General Electric, Schenectady, N. Y.*

40 YEARS OF G-E EXPERIENCE DEVELOPING BETTER LUMINAIRES

1900 The first luminaire—the PARABOLIC REFLECTOR

1905 RADIAL-WAVE REFLECTORS placed on the market

1907 REFRACTOR used to control light on the roadway

1913 The first glass-enclosed luminaire—the FORM 1

1933 The SODIUM LUMINAIRE

1935 The FORM 79—the first lightweight, high-efficiency, low-cost luminaire, with the spun-on globe

1938 The STEPPED REFLECTOR developed to reduce temperatures at the lamp stem

1940 The STREET-LIGHTING EVALUATOR—a new technique to accurately evaluate the effectiveness of street-lighting systems

1940 The FORM 101, with the "heat-insulating" hood to protect the rubber cable insulation

GENERAL ELECTRIC

452-10

ELECTRA'S HUSBAND

Service Despite Air Raids

"THERE was a speech," Electra said turning away from the radio as Winston Churchill finished his memorable February 9 broadcast. "Why every time he mentioned 'that man' I could actually see him sneer even without television. Which reminds me, what do you hear about your electrical confreres in England?"

"Not much," I replied. "The censorship is strict. About all we learn is what we read in the *Electrical Review*. Even that staid electrical weekly takes the war philosophically. It seldom mentions it as a matter of fact. I'll see what I can find in recent issues and tell you about it tomorrow."

Next day at the office I scanned half a dozen copies of *Electrical Review*. There was more about wartime precautions and operations in the advertisements than in the editorial pages. Here was the text of an ad that was enlightening:

"Glass-Bulb Rectifiers Pass Through Air Raids Unharmed—It has often been suggested that the effects of a high-explosive bomb would prove detrimental to the glass bulbs in our mercury-arc rectifiers. Prior to the War little data was available about the effects of concussion or vibration caused by bursting bombs. Quite recently, however, bombs were dropped very close to one of our 1,000-kw. multi-bulb installations in this country without causing any damage to the bulbs; in fact a very important D.C. supply was maintained throughout. This is not an isolated case, and the information which we now have on the effects of concussion and vibration entirely confirms our previous statements that our bulbs would not be affected by the explosion of bombs even a short distance away."

While the maintenance of continuous supplies of power to essential industries is a matter of considerable anxiety, the things that happen to loads and demands are really something for operating and commercial men to ponder over. Speaking of losses caused by evacuations and the cessation of service to uninhabitable properties, one article continues:

"Next there is the fact that from dusk onwards a very large proportion of the population spends the evening in shelters. Whether these are public or private, there is a marked decrease in the amount of electricity required for lighting. A public shelter may or may not have electric lighting and in any case it is usually far from brilliant . . . Furthermore, the (now) early hour of 'going to shelter' is resulting in the elimination of cooked evening meals. A further lost load is resulting from the earlier closing of offices and shops, and while the latter were last winter permitted a restricted form of window lighting, the raids have put a stop to this.

"On the credit side there is the fact that consumption is going up in houses in which additional people are now living. Also owing to the replacement of broken windows by opaque materials, artificial lighting is often necessary throughout the day. The discontinuance of shop window lighting is causing shopkeepers to make a special effort to render the interior of their premises as bright and attractive as possible."

This story went on to tell how electric "fires" were being used almost entirely as a means of heating between air raid warnings, principally on account of their safety. Also how electric equipment had been applied to shelter heating. One and 2-kw. bar element type heaters are being used in air raid warden's and fire marshal's posts, both for heating and for supplementary cooking. The breaking down of gas supplies has brought on a tremendous demand for electric "cookers" (ranges), hot plates and kettles.

"Taken all in all," the article concludes, "the job of the electricity supply authorities and their staffs today is not an enviable one. Damaged plant and mains (underground cables), the maintenance of existing supplies and the provision of emergency services, and the loss of consumers' load and revenue, all add to their anxieties. . . . Be that as it may, whatever else may be the result of this war, it is certain that electricity, on its performance of the last two or three months alone, has added very appreciably to its prestige and this will have an immediate effect when normal development work is resumed."

The task of the maintenance crews is no sinecure. One writer who, the magazine explains, "operates in a heavily bombed area," tells how underground cable stands up under bombing. He says:

"In my district some of the heaviest attacks have been made and cables of all varieties, from 11-kv. feeders to 200/400-volt distributors, have been put to severe tests. How they have stood up to it is astounding. Cable manufacturers would have resented a clause in prewar specifications making it a condition of acceptance that the cables should be capable of stretching one foot in sixty without damage to dielectric or lead sheathing. It has, however, been abundantly proved in the last few months that British cables would have had no difficulty in complying with such a condition. Even cables for pressures up to 33 kv. have proved their British tenacity in this way.

"At the moment an 11-kv. three-core cable in this district is carrying load, although it has disappeared due to the collapse of the crater edge and is many feet below its correct level. One of our 0.2-sq.in. high voltage cables has been found lying on the surface of a carriage way, whereas it was originally drawn into a cast-iron pipe two feet under the footpath; yet it continued to supply a whole district until we could cut out the somewhat embarrassing slack and replace the rest in its original position where it still is in use.

"On the other hand cables up to 0.3-in. in cross section have been completely severed. The sleeves of wiped joints have been pulled apart in the center, together with the cores. . . . In one case a network box on the low-voltage distributors was missing after an air attack. It was found in a basement with the cables still attached. We put it back in approximately its original position, propped up on wooden stakes and it proceeded to function as usual."

Bomb craters afforded considerable trouble according to this author. His experience had shown that it was not possible to splice a new section in a cable and then return it to the bomb crater, principally because of the maze of other services interrupted — water, gas, telephone and sewer.

Further along in his article this author said that their prize crater was 60 ft. wide and 35 ft. deep. The next night when Electra read this she paused and said:

"I know a couple of prominent European dictators whom I would like to see dumped in that bomb hole and buried—dead or alive."

NO CRYSTAL GAZING,

but we DO see into the future

Chemical and metallurgical research in cable materials predetermines operating behaviour of new designs and constructions

Behind the quality of Anaconda stands the painstaking and precise analysis of the trained engineer and research chemist. Searchingly, unceasingly, they gaze into the future . . . the future performance of every inch of Anaconda Wire and Cable . . . but *their* tools are the exact and unimpeachable instruments of science.

Their findings, with numerous other tests, both chemical and physical, unite to form a strict manufacturing control from which Anaconda develops new and better products to meet and exceed the ever-increasing needs and specifications of the customer.

ANACONDA
from mine to consumer

Keen eyes peer through this metallographic microscope looking for flaws and weaknesses in metal samples. Only those that pass this man's expert scrutiny . . . those that measure up to Anaconda's standards . . . are passed.

A Wire and Cable for Every Electrical Requirement

The Anaconda line is complete, including standard and special power cables, rubber-covered wire, magnet wire and coils. Each product has benefited from Anaconda's continuous development and research program.

USE MODERN IMPROVED **Anaconda Wire & Cable**

ANACONDA WIRE & CABLE COMPANY, General Offices: 25 Broadway, New York City; Chicago Office: 20 North Wacker Drive
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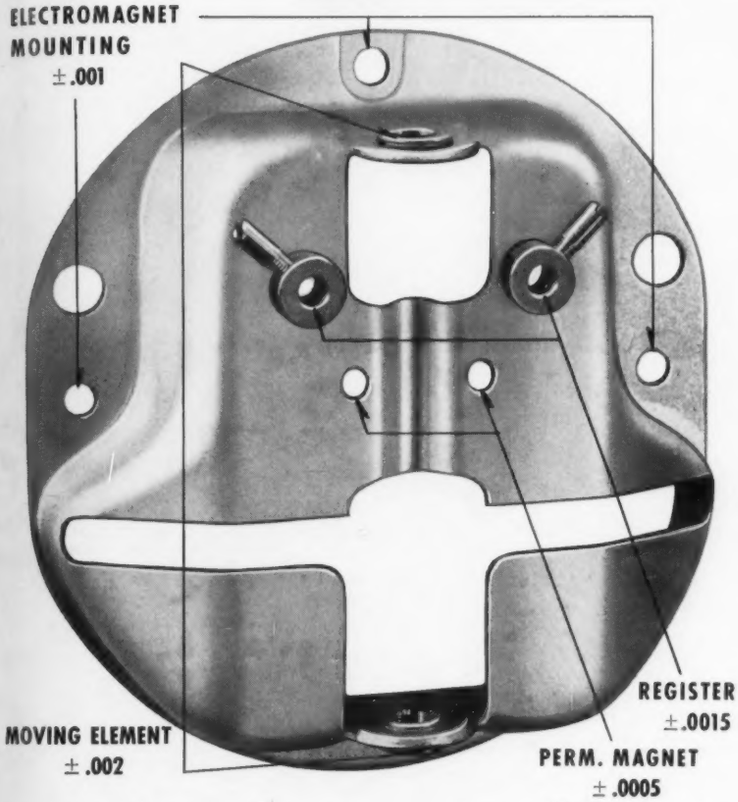
backbone

OF LONG TIME METER VALUE



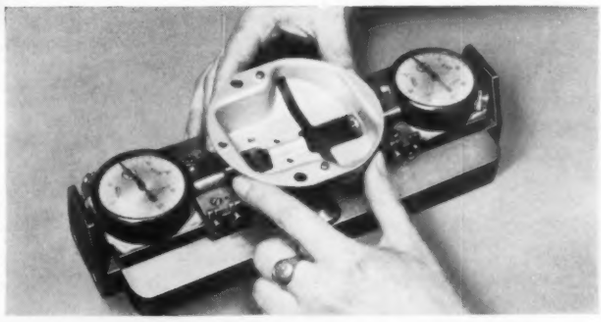
MICROMETER CHECKED 3 WAYS

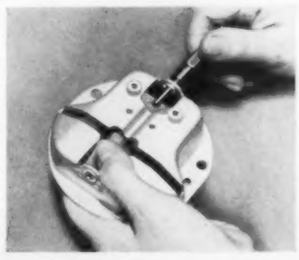
This checking of over-all dimensions, mounting holes, and bearing supports is one of the big reasons why moving element, damping magnet, electromagnet and register slide together without forcing, always in correct position. There are other reasons why Westinghouse Long Time Meters reduce metering costs. Many of them are definite visible points that you can see with your own eyes. Our illustrated book "The Key To Long Time Meter Value" is a guide to these visible points. Write for B-2247. Westinghouse Electric & Manufacturing Company, Dept. 7-N, East Pittsburgh, Pennsylvania.

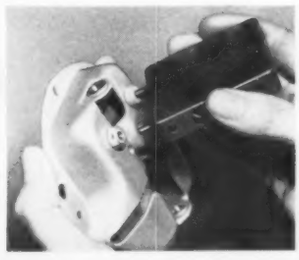
LOOK AT THIS FRAME FOR EVIDENCE OF LOWER METERING COSTS

One of the big reasons why you can take down and reassemble a Westinghouse Long Time Meter without disturbing calibration is the fact that all parts are assembled on a strong precision-made frame. It's the "*backbone*" that keeps the other parts in correct relationship . . . and correct relationship of the driving, moving, damping and registering elements is essential in order to maintain calibration.

We take no chances on errors in over-all dimensions, mounting holes, and bearing supports—separate sets of dimensions in each frame are checked—many are controlled within tolerance down to .0005. If the gauge shows deviations from these closely controlled tolerances, the frames are rejected as not good enough to go into a Long Time Meter.







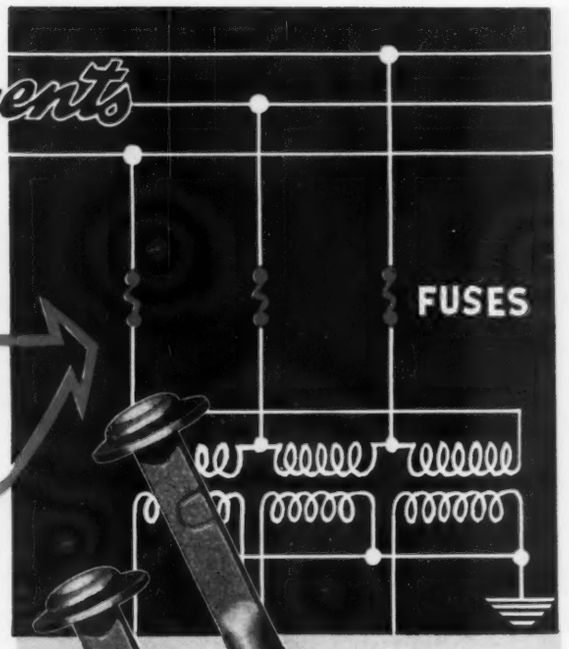
J-40292

Westinghouse Meters

Westinghouse Porcelain

WESTINGHOUSE ELECTRIC

Reduce Link Replacements by 66⅔%



If One Link Blows . . . Replace Only that One . . . Not all 3 . . .

Save the Cost of Two Links and Replacement Time

● Numerous cases are found on three phase distribution systems where all *three* fuse links are replaced when *one* blows.

Experience has shown, however, that where S & C Silver Fuse Links are used in the cutouts that *the blown link only* requires replacement—*not* all three.

S & C Universal Fuse Link elements are designed and constructed on the same principle—and with the same accuracy as the fusible element in S & C Liquid Fuses.

While they cost so little, the selection of links is of greatest importance, since on their performance the operation of the cutout depends.

The fusible element is mechanically clamped (no solder) which permits extreme accuracy and uniformity of calibration. Thus S & C Silver Links resist corrosion,—withstand surges,—*retain* their accuracy, — don't shift characteristics, — are mechanically stronger. S & C Links will save by reducing outages and link replacement costs by 66⅔ per cent.

For better overall economy—for improved customer service, equip more of your cutouts now with S & C Silver Links.

For a clear discussion of fuse link engineering, refer to S & C Bulletin 218.

Packaged in handy containers...clearly labeled at each end

FUSE LINKS For ALL Makes of Cutouts

SCHWEITZER & CONRAD, Inc.
4435 Ravenswood Avenue, Chicago, Illinois
Manufactured in Canada by Powerlite Devices Ltd., Toronto, Ontario

WESTERN REPRESENTATIVES:

SAN FRANCISCO
George E. Honn, 420 Market Street

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SALT LAKE CITY
Riter Engineering Co., Kearns Bldg.

Why you get *ValuePlus* in O-B Station Insulators

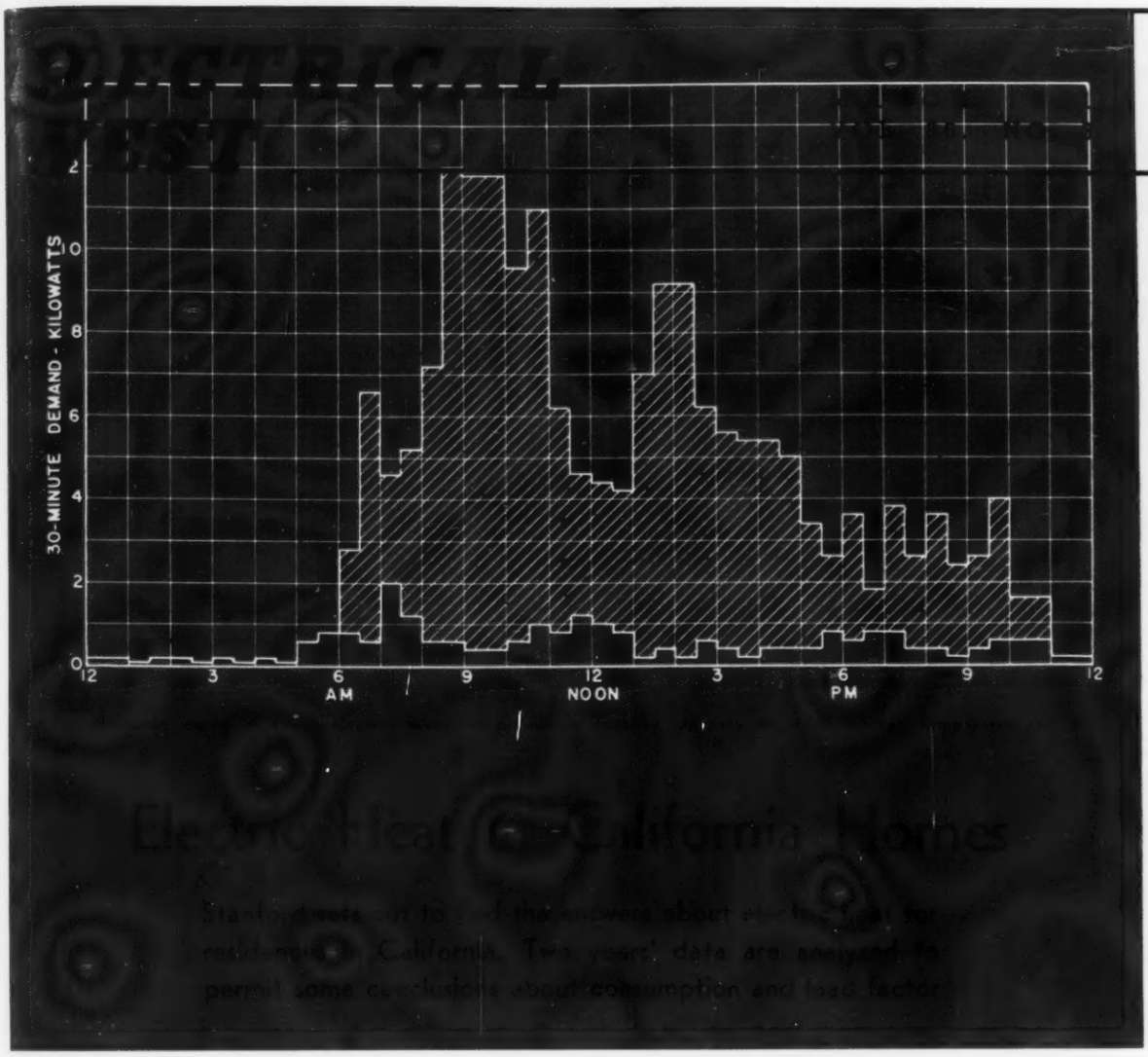
● When you specify O-B switch and bus insulators you get units which are properly designed, thoroughly tested in laboratory and field, and built to the high standards maintained by O-B. And this assurance of top quality, giving an extra value in performance and life, applies both to station pincaps and posts. All O-B units are made from a superior grade of porcelain. Caps, bases and pins are machine-faced and hot-dip galvanized to prevent corrosion. All cemented joints are treated to provide necessary resilience to withstand sudden shocks and harmful stresses. Precision jigs are used for assembly, insuring proper alignment, interchangeability and full strength. Proper balance and shape of porcelain and metal parts give maximum electrical efficiency. All units are weather-resistant and are positively free of radio interference. Every manufacturing process is closely controlled, resulting in uniformity. And each unit must pass several rigid inspections. With pincaps and posts available in all styles and sizes you can secure a *quality* station insulator for any requirement—by specifying O-B!

Buy the Best ...Buy O-B

Ohio Brass (OB)

MANSFIELD, OHIO, U. S. A.

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ontario



By P. F. Offerman, W. J. Walsh and H. H. Skilling

all of Stanford University

HOW much electric power is consumed when residences are heated by electricity? What time of day is the heating load greatest? What load factor can be expected from an electrically-heated home, or from a group of homes all heated by power from the same feeder? What is the annual load cycle for heating?

To find the answers to questions like these, Stanford University has carried research to the customers' premises in making a survey of electrically heated residences in central California. With the cooperation of the owners of electrically heated homes, and aided by the electric utility organizations of the region, recording meters were placed in typical homes in a cross-section of California extending from Santa Cruz on the ocean to Sonora in the Sierras.

This study of electric heating loads began with the establishment at Stanford University of the W. Wesley Hicks Research Fellowship in Electrical Engineering in 1938. Analysis of data collected through two years is now complete, and some of the more significant results are:

1. Although the electric heating load of a single residence varies with the whims of the occupants, the combined load of twenty or more electrically-heated residences is not greatly affected by individual fluctuations. The load curve for a group of homes will therefore follow a typical curve with fair accuracy, and curves have been determined for various temperature conditions.
2. The load factor on a feeder that supplies a group of electrically-heated homes is ordinarily very much higher than the load factor of any one of the homes by itself.
3. Load factor and kilowatt-hour consumption are dependent on temperature in a predictable manner, being higher on colder days.
4. If electric heating is installed in a private residence that was previously equipped with electric lights, electric range, and electric water heater, the daily load factor as well as the kilowatt-hour consumption goes up. The annual load factor for a single residence goes down.
5. But in an agricultural region, the annual load factor of the region is improved by electric heating.

Facts and figures from the survey illustrate these conclusions. Fig. 1 shows a typical record of power demand taken from an "all-electric" house on a cold day in January 1940. The space-heating load and the total load were metered separately; in the figure the upper curve represents total load, the shaded area is heating load, the lower curve is for lights, range, water heater, and miscellaneous appliances. The average outdoor temperature on this day was 43°, a cold day for central California. The load factor for power other than heat-

"Sunset" Magazine Photo

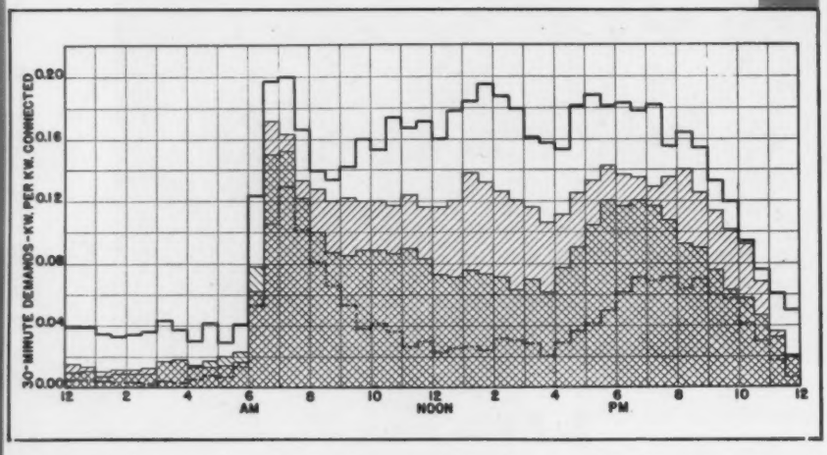


Fig. 2—Daily space-heating load curves from data recorded on normal week days. Curves are for days with following average temp. 40°, 45°, 50°, 55°

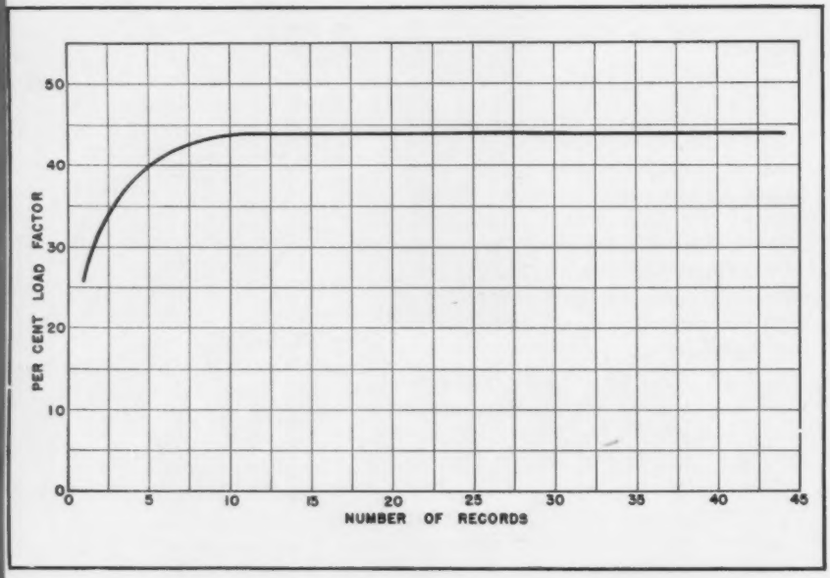


Fig 3—Variation of load factor with size of group. Mean temperature 50°

ing is 29%. The load factor including heating is 33%. This increase is illustrative of what may be expected in general, for it is found that when the mean temperature is less than 55°, space-heating load usually increases the load factor of a residence.

But the daily load curves of a single house vary widely, and individual differences are very prominent in the electric heating records. One family turns off the heat and presumably goes to bed at ten, another burns the heaters until the small hours — particularly week-ends; in one house a heater is left on all night on cold nights; in another the house is warmed only mornings and evenings for the family is away all day. Saturdays, Sundays and holidays are different from normal week days in most houses. Almost everyone gets up later on Sundays. One owner requires more warmth on Sundays and runs his heaters steadily during the day, while another goes on week-end trips and leaves the house cold from Saturday noon until late Sunday night. Some homes have automatic heat control by means of thermostats, while others depend on manual operation. There are varying degrees of thermal insulation used in different residences.

To avoid these personal differences and obtain information of statistical value, individual records were combined. Readings of the graphic meters were added for each half-hour, many charts being totaled together to give information representative of a large group of electrically heated homes. Since it was desired to gather data applicable to a group of houses all exposed to the same weather, charts were classified, before being combined, according to the average outdoor temperature of the locality in which they were recorded.

Thus the information for Fig. 2 was obtained. The upper curve is the summation of 43 records of electric space heating that were made on days during which the average outdoor temperature was in the 40° range (between 37.5° and 42.5° F.). The three lower curves are similar, being summations of 128 records on days in the 45° range, 196 records in the 50° range, and 109 records in the 55° range, respectively. Load factors determined from these curves are as follows:

Temperature	40°,	load factor of	43	residences	....	63%
"	45°,	" "	128	"	....	53%
"	50°,	" "	196	"	....	45%
"	55°,	" "	109	"	....	29%

In making use of results like these it is necessary to consider how large a group of records is needed to give a reliable value of load factor. It is evident that two houses will have a higher load factor than one house, for their peak demands will not usually come a

the same time. Similarly, ten houses will have a higher load factor than two houses. But a hundred houses will have practically the same load factor as a thousand houses, for individual differences will be as indistinguishable in the smaller group as in the larger. To determine how large a group of residences is necessary for statistical purposes, Fig. 3 was drawn. This figure shows how the load factor (at a mean temperature of 50°) varies with the size of the group; the load factor is practically constant at a value approaching 45% for any number of residences greater than ten. From this it appears that the groups of records combined for load factor study, as in Fig. 2, were all large enough; for the smallest was the summation of 43 charts, and it makes little difference how large the group, if it is greater than ten or fifteen.

On a cold day, more power is used for electric heating than on a warm day. This is obvious; and it is so consistently true that a curve can be drawn to tell how much electric power will be consumed by a group of electrically-heated residences on a day of given average temperature. This is done in Fig. 4, and the power demand is seen to be very nearly proportional to the deficiency of temperature below 62°. Load factor is also dependent upon temperature, as was mentioned in connection with Fig. 2, and the relation obtained from all available data is shown in Fig. 4. The indication is that the public turns on its bedroom heaters for a few minutes before getting up in the morning if the temperature is about 65°, and on a colder day it turns on more heaters and leaves them on longer.

Electric heaters are off-duty in the summer. In central California, the greatest demand for heat is in January, and over 90% of the year's heating load is in seven months, from October through April. This is shown in Fig. 5. For comparison, the annual load curve of a rural substation is also shown. This substation is typical of many in the Central Valleys, for it has a large agricultural pumping load that is off-duty in the winter. From October through April the substation is lightly loaded.

Study of electric heating is being continued under the Hicks Fellowship. This year the recording instruments are installed in electrically-heated public schools, and every winter day brings a new set of charts with information about the heating requirements of school rooms.

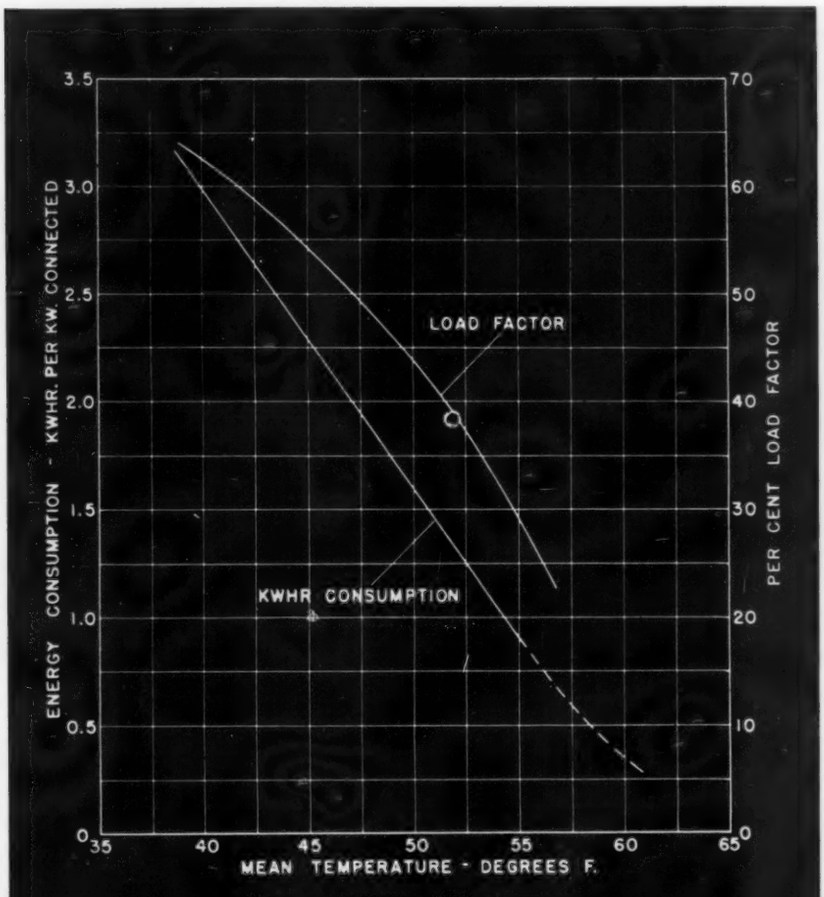


Fig. 4 (top)—Effect of mean daily temp.

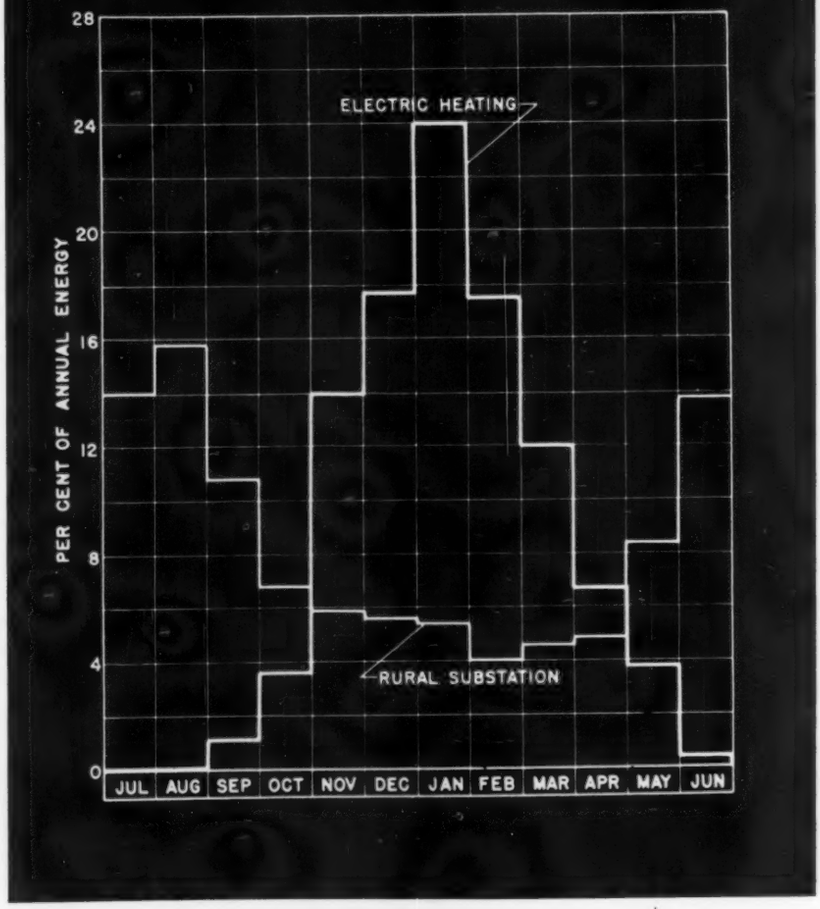


Fig. 5—Monthly use and delivery of sub

Practical Aspects Of Electric Shock

What electricity is safe? Every electrical man should be able to give a fairly exact answer. The authors round up the full field of knowledge on electric shock and tell you about it in its practical terms. They tell about their own experiments at the University of California with more than 100 men. Their warning is: Watch out for 60-cycle currents of more than 8 or 9 milliamperes

By Charles F. Dalziel and John B. Lagen, M. D.
Univ. of California U. C. Hospital

DURING the past four years information on the effects of small currents, currents too small to have any ill effects under laboratory conditions, has been obtained by the authors in carefully conducted experiments on volunteer subjects at the University of California. The results of preliminary experiments were published in ELECTRICAL WEST in 1938, and recently two papers presenting a detailed account of the work have been prepared. The purpose of this article is to correlate and summarize the results of this investigation with previous knowledge.

In the interest of safety, the subjects used in these experiments were given a physical examination limited to the circulatory system and an electrocardiogram. Only those over 21 years of age, in good physical condition, without history of recent illness, and who had normal blood pressures and electrocardiograms were used. The currents used in these experiments were small enough to be harmless under controlled conditions, but the higher values were large enough to be hazardous under many conditions likely to be met in the field. It was realized that the results on 60 cycle alternating current and direct current would have the greatest practical value, and most of the detailed tests were made on commercial 60-cycle currents. A comparison of the results of this investigation and work done in Europe indicates that values for 50-cycle currents are substantially the same as for the higher frequency. Some tests were also made on frequencies of from 5 to 10,000 cycles for purely scientific purposes.

Threshold of Mucous Membrane Perception

It is interesting to consider the smallest currents that were perceptible under normal circumstances. Two electrodes consisting of No. 18 platinum wires 1 in. long and separated ½ in. by means of a bakelite separator were placed lightly on the tip of the tongue to determine the threshold of perception. Platinum wires were used to minimize galvanic effects. The sensation is probably best described as one of taste and is distinctly different than that caused by shock or muscle stimulation. There was considerable variation among individuals and between successive tests on the same individual. The average of several trials was taken as the value for the individual.

The results on 60-cycle a.c. for 115 men were: 43 microamperes average; 30 microamperes median; 4 microamperes minimum; and 315 microamperes maximum. The results for these 115 men on direct current were: 44 microamperes average; 16 microamperes median; 0.6 microamperes minimum and 783 microamperes maximum. It was apparent from inspection of these values, and also from a detailed statistical study, that the response of the group did not follow a normal distribution, but was skewed positively (toward the higher values). Therefore, it was concluded that the median value, which represents the response of 50% of the group, should be considered to be the threshold. Accordingly, the threshold of mucous membrane perception for 60-cycle alternating current was 30 microamperes, and 16 microamperes for direct current. This is the only area in the body (so far investigated) wherein man is more sensitive to direct current than to 60-cycle alternating current.

Threshold of Skin Perception

The threshold of feeling with electrodes held in the hands was determined on direct current and on 60-cycle alternating current. The palms of the hands were rested on two No. 7 copper wire electrodes. The hands were moistened with a salt-water solution in order to reduce contact resistances and permit the use of low voltages for safety. The current was then gradually increased and several trials were made to determine the smallest current that could be felt. The first sensation was one of slight tingling or warmth in the palm of the hand or in the wrist. These sensations are in contrast to a piercing sensation when the hands had open cuts or abrasions.

Only subjects having healthy hands with intact skin were used in this investigation. As before, the average of several trials was taken as the value for the individual. The results on 60-cycle alternating current for the 115 men were: 1.1 milliamperes average; 1.1 milliamperes median; 0.4 milliamperes minimum; and 4 milliamperes ma-

mum. The results for the 115 men on direct current were: 5.2 milliamperes average; 5.0 milliamperes median; 2.1 milliamperes minimum; and 12.6 milliamperes maximum.

The experimental points and the corresponding normal distribution curves are shown in Figs. 2 and 3. It is apparent that the response closely approximated a normal distribution. In these tests, and in all tests involving muscular stimulation, average and median values were essentially identical, and the average value was considered to represent the threshold. Therefore, the threshold of skin perception for 60-cycle alternating current was 1.1 milliamperes, and 5.2 milliamperes for direct current. This is in close agreement with the generally accepted value of 1 milliampere for 60-cycle currents. Comparison of the results obtained in this investigation and those obtained by other investigators on 60-cycle alternating currents substantiates the conclusion that the threshold of feeling for electrodes held in the hands is independent of moisture on the hands or the size of electrodes. In passing, it is interesting to note that man is about five times more sensitive to 60-cycle alternating currents than to direct current.

Threshold of Muscular Non-control

Considerable time and effort was spent in determining the 60-cycle let-go current for 114 men. Experiments were also made to determine the effects of frequency, and sine wave currents from 5 to 10,000 cycles were used. In addition, some tests were made on direct current. A smaller group of subjects were used in preliminary investigations to determine the effect of the surface condition of the hands, the size of electrodes, the effects of wave form, and the response on repeated trials.

With electrodes held in the hands, if the alternating current is gradually increased, the tingling sensations give way to pronounced sensations of warmth and muscular stimulation. As the current is further increased, muscular contractions predominate, and a point is finally reached where the subject is unable to release his grasp of the electrodes due to severe spasm of the wrist and arm muscles. We have defined the current at which this occurs as the let-go current.

In these tests the let-go current was checked by several trials, insufficient in number to cause fatigue, but sufficient to permit a determination of his let-go current within a range of about ½ milliampere. Photo (p. 40) illustrates the muscular reactions and the test procedure used in determining let-go currents. It is apparent that the muscular reactions required anchoring the other hand rather firmly on the brass plate to insure good contact at this part of the circuit.

Let-go current tests using a convenient length of No. 6 copper wire were made with dry hands, hands moist from perspiration, and dripping wet from salt and weak acid solutions. It was found that the surface condition of the hands had no measurable effect on the let-go current values. However, it was noted that moisture on the hands materially reduced wide variations in contact resistance, and also reduced the sensation of burning due to high current densities at tender spots, and at the instant of releasing the electrode. For these reasons, all subsequent let-go current tests were made with the hands moistened with a weak salt solution.

The effect of electrode size was investigated using electrodes consisting of the No. 6 copper wire and brass rods approximately ½, ¾ and 1 in. in diameter. In the interest of reliability, comparative tests were conducted on the same afternoon. Only two, or at most three, tests were made per day to minimize the effects of fatigue. From a comparison of average values obtained on several subjects, it was concluded that the let-go current was independent of electrode size.

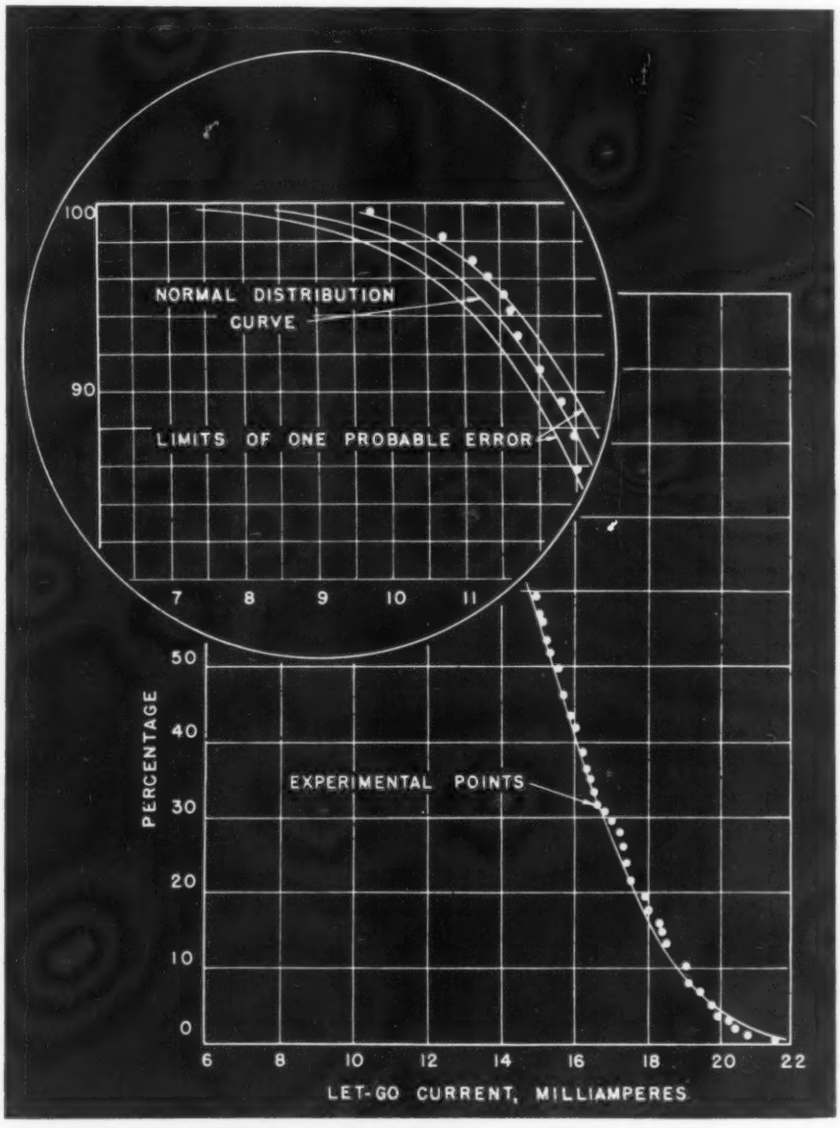


Fig. 1—Distribution curve for 60-cycle let-go current

The effect of wave form was investigated by comparing the let-go currents with the copper-wire electrode using 60-cycle sine-wave currents alone and in combination with a third harmonic equal to 37½% of the fundamental. The third harmonic was shifted so that in one case the resultant wave was sharply peaked. In the other case, the third harmonic was shifted 180° in

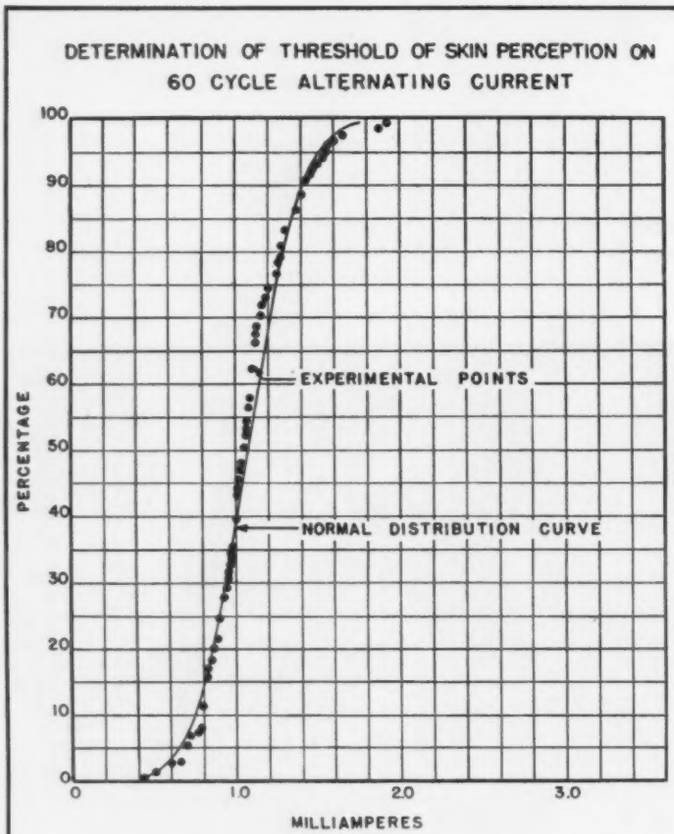


Fig. 2

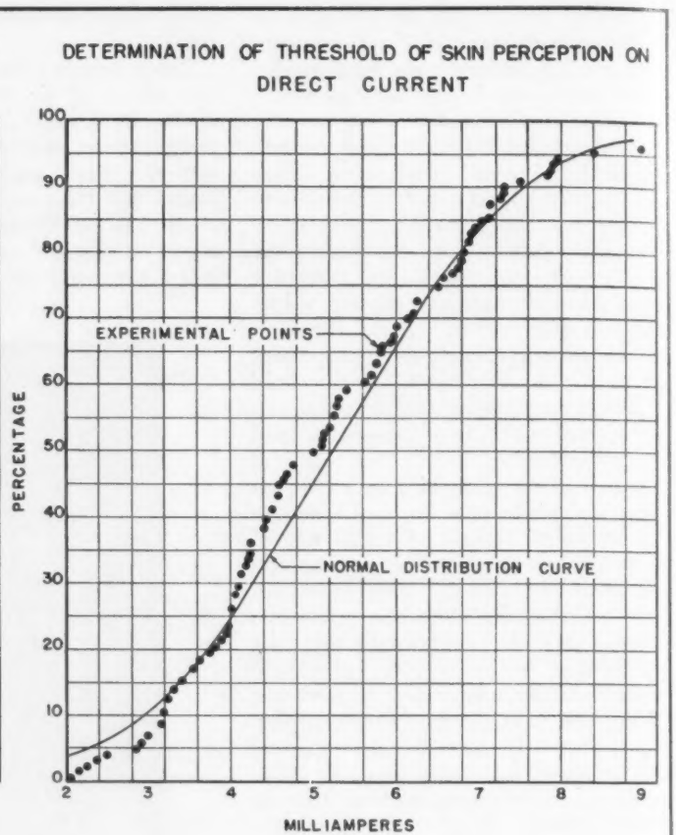


Fig. 3

phase and super-imposed on the fundamental to produce a relatively flat-topped wave. Tests were made using the three wave shapes on the same afternoon to obtain comparable results. The three different wave shapes were taken in random sequence to minimize the effects of fatigue. From the results obtained on 26 subjects, it was apparent that muscular response depends on the peak or crest value of the current and *not* on the effective value.*

The possibility of developing a degree of immunity to electric shock was investigated by determining the 60-cycle let-go current at weekly intervals on a group of especially interested subjects. The copper-wire electrode was used in this test. Although some degree of immunity was obtained, the increase was negligible from a practical standpoint. The results for ten subjects are shown in Fig. 4. The general trend was upward for the nine week test interval; however, there was considerable variation in the successive tests. It was concluded that the variations were due to psychological and physiological factors which were obviously beyond the control of the investigators. From this and the results of the next test, it was concluded that to obtain valid conclusions, tests of this nature must be made on a relatively large number of subjects, and they may be interpreted statistical analyses based on a normal distribution of experimental data.

The let-go current using the No. 6 copper-wire electrode was determined on 114 men for 60-cycle alternating current. The results of this test are shown in Fig. 6. The following let-go current values were obtained: 15.5 milliamperes average; 15.6 milliamperes median; 9.7 milliamperes minimum, and 21.6 milliamperes maximum. The threshold of muscular non-control was considered to be the average value of 15.5 milliamperes. In each instance, the individual's let-go current was the value obtained on his first 60-cycle test, although some of the subjects were tested first on other frequencies. The maximum value of 21.6 milliamperes for one subject was obtained on his first test. That is, after several trials, he finally reached this let-go current value. He had not previously been tested on other frequencies, or on 60 cycles. It was noted that this relatively high current produced less reaction than that obtained on the subject having the minimum value of 9.7 milliamperes. From this it was concluded that both sensations and muscular response due to electric currents vary considerably between individuals. The close agreement between the individual points and the normal distribution curve substantiates the conclusion that the results of this type of investigation follow a normal distribution.

Fig. 5 shows the let-go current values obtained for 25 subjects on 5-cycle alternating current. The wider scattering of points around the normal curve is believed due to the limited number of subjects used at this frequency. A larger number of subjects was not used because of the limited interest at this frequency.

Fig. 6 gives similar results on 10,000 cycles. It was interesting to note the much higher values obtained on this frequency, from 57.6 to 92.5 milliamperes.

Let-go current tests using at least 25 subjects were made on 5, 10, 25, 60, 180, 500, 1000, 2500, 5000 and 10,000 cycles. Curves similar to those just described were plotted. The results from these curves have been consolidated to show the effect of frequency on let-go currents, see Fig. 7. The necessity for using a large number of subjects is apparent from inspection of the probable errors. The relatively small probable error for the 60-cycle test is attributed to the much larger number of subjects used on this frequency.

When direct current was used instead of alternating current, the sensations produced were those of internal heating rather than tetanic contractions of the musculature. Sudden changes in current magnitudes produced muscular contrac-

*Note: r.m.s. current values have been used in all curves to avoid confusion and conform to conventional practice.

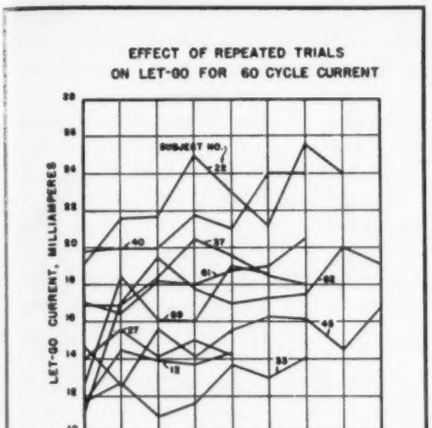


Fig. 4

tions, and interruption of the circuit produced a very severe shock. Tests were made on 28 men, and in each case they experienced little difficulty in releasing the test electrode. This difference in muscular reaction is in contrast to that produced by alternating currents in which there is a very definite limit to the current that can be released. The test was started at a low current; several trials were made, and the current was increased until the shock produced at the instant of release from the electrode became unbearable. The final values obtained were termed release currents, and they represent the limit of endurance rather than the let-go value. The direct-current release currents for 28 men were: 61 milliamperes minimum; 74 milliamperes average; and 83 milliamperes maximum. This is interesting because it confirms the common belief that direct current is safer than 60-cycle alternating current.

Safe Currents and Voltages

Several factors must be considered in deciding what constitutes a safe current. The victim of an accidental shock can often release himself by using muscles little affected by the current. The muscular reactions produced by the current may tend to break the circuit rather than to improve it, or loss of balance may free the victim. When a man realizes his predicament, he will certainly exert more effort to free himself than that stimulated in these experiments. Fright, on the other hand, might tend to nullify his efforts, and exhaustion certainly would do so.

In certain devices having exposed electrodes, such as electric insect traps and fly panels, because of the close spacing of the insect electrocuting grids, a good grip on the exposed electrodes is practically impossible. On the other hand, in accidents involving electric fences or hand welding apparatus, the likelihood of making good contact is to be expected.

In the interest of safety, current values considered safe for man must be determined with regard to special devices and unusual circumstances. With the above in mind, it was concluded that the safe electric current for man was that value which could be released

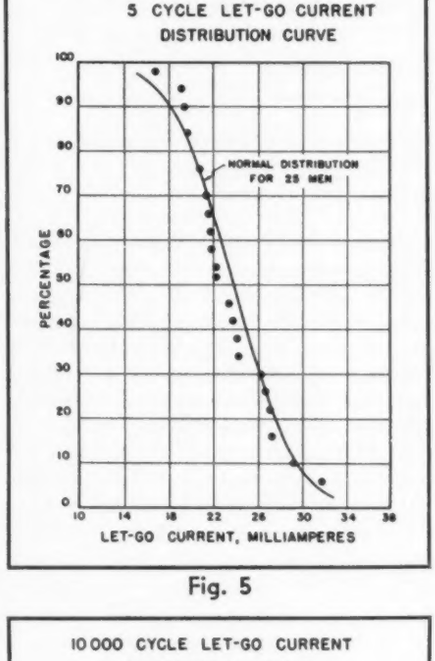


Fig. 5

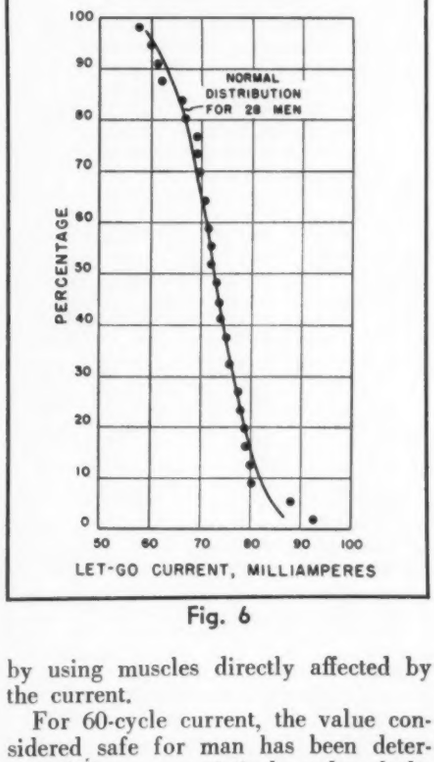


Fig. 6

by using muscles directly affected by the current.

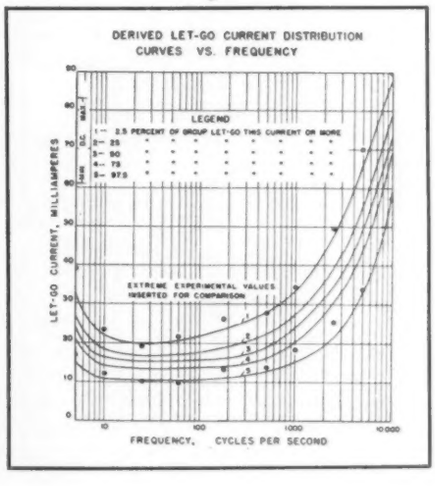
For 60-cycle current, the value considered safe for man has been determined from a statistical study of the experimental results. Referring to Fig. 1, the enlarged section of the upper portion of this figure shown therein, it is obvious that the farther to the left one goes on the curve, the greater are the number of men who can release a given current. If it is assumed that 114 men used in this experiment represent a cross section of all men of the same age and physical condition, 99½% of all men, or for example, 995 men in a group of 1000, would be able to let go of 8.8 ± 0.8 milliamperes or more current. The remaining ½%, or for the example chosen, the remaining five in the group, would not be able to release a current of this magnitude. Taking the above factors into consideration, and the expected performance of 99½% of all men as a criterion, the authors are of the opinion that a reasonably safe 60-cycle alternating current for man is 8 to 9 milliamperes r.m.s.

It has been mentioned that steady direct currents produce much less severe muscular reactions than those produced by alternating currents. Within the range covered in these experiments, physical endurance and the determination of the subject set the limit of the maximum release currents. Considering these factors, it appears conservative to conclude that the maximum safe direct current for man is at least 80 milliamperes.

Reasonably safe currents for children, particularly infants on alternating current, are undoubtedly lower than the values stated above as probably safe for man.

This matter is of vital importance due to the increasing use of electric fences and the many deaths that have occurred with these devices. With the above in mind the authors question the safety of the non-interrupted alternating current fence. The regulations covering this type of fence are as follows: "The maximum current which can be delivered by the controller under any load condition, but not less than 500 ohms, including the measuring in-

Fig. 7



strument connected in series with the fence terminals, shall not exceed 8 r.m.s. milliamperes." (8) It is probable that this maximum output current is safe for man. However, in view of the above, currents of this magnitude may be dangerous for others, particularly small children. The authors believe that this type of fence or fence controller, in which the exposed conductor is energized continually from an alternating-current source, must be limited to at least half the value specified in the present regulations in the interest of public safety.

Tests were made to determine the resistance of the body by measuring the body and skin resistance with both arms submerged to the elbows or standing in a salt water solution. This was done to minimize the effect of skin and contact resistances and to simulate extreme conditions where the skin had been burned through to the flesh, or in accidents where excessive water was present, such as those occurring in bathrooms, or where the victim was standing in water, such as in an irrigation ditch or a sump.

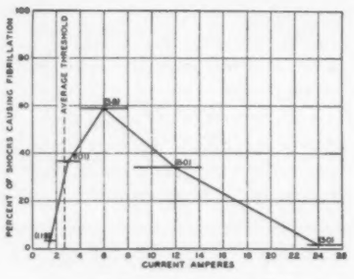
Resistance for the group was uniformly low, and pending completion of this part of the investigation, it is believed that reasonable values for body resistance are from 400 to 600 ohms.

If the safe 60-cycle alternating current is taken at 8 to 9 milliamperes, it is apparent that the corresponding safe 60-cycle voltage is 3 to 6 volts. For direct current, the safe voltage would be about ten times this value. There is no intention to infer that these voltages should be considered particularly dangerous. Current and not voltage is the proper criterion of shock intensity. A dangerous voltage is that value which produces a current above the threshold of muscular noncontrol. In accident cases the current produced by a given voltage is limited by the circuit impedance, contact and skin resistance, and body impedance. The resistance of dry skin may be as high as 100,000 ohms per sq. centimeter. Body, skin, and contact resistance with hands wet and feet in water may be as low as 1,000 ohms.

Effects at Higher Currents

Direct experimentation on humans at currents higher than those used in these experiments for obvious reasons, is out of the question. The following is believed to represent the generally accepted phenomena at higher currents.

Muscular contractions and accompanying sensations increase in severity as the current is increased. The muscular contractions progress up the arms to the chest until they become so severe that the victim is unable to breathe. Obviously, if the current flows for more than a few minutes, death may result from asphyxiation. However, if the circuit is interrupted in a reasonable time, breathing resumes automatically, and no serious after-effects are likely. Currents considerably in excess of those required to cause a stoppage of breathing due to excessive muscular contraction of the chest muscles may produce a break in the nerve impulses between the brain and the respiratory organs. This results in respiratory paralysis, which may persist for a considerable period after interruption of the current. In this case, artificial resuscitation must be applied immediately to prevent asphyxial death. Often the block in the nervous system disappears in a few minutes, or in a few hours, and continued application of artificial resuscitation may save the victim. Mere cessation of natural breathing is not likely to produce serious after-effects or permanent damage, as evidenced by the many persons who have been resuscitated successfully.



Effect of current on susceptibility of sheep hearts to ventricular fibrillation

Shocks of 0.03 second, 60 cycles, applied in partial refractory period of cardiac cycle
Number of shocks and current spread indicated for each point on curve

Fig. 8

Threshold of Ventricular Fibrillation

Much valuable information on lethal currents has been obtained from extensive experiments performed on animals at Columbia University, by Messrs. Ferris, King, Spence, and Williams. (6) These authorities have adeptly described the fibrillating condition as follows: "Currents somewhat greater than those just necessary to stop respiration by action on the muscles may cause fatalities, even though the duration of such shocks is but a few seconds or less—far too short to be important from the standpoint of interruption of respiration and obviously too short to give any opportunity for rescue before the end of the shock. Death under such conditions is brought about by ventricular fibrillation, which is a disruption of normal heart action. This condition is an uncoordinated asynchronous contraction of the ventricular muscle fibers in contrast to their normal coordinated and rhythmic contraction. It results from an abnormal stimulation rather than from damage to the heart. In the fibrillating condition, the heart seems to quiver rather than to beat; no heart sounds can be heard from a stethoscope; the pumping action of the heart ceases; failure of circulation results in asphyxial death within a few minutes." The minimum current required to cause ventricular fibrillation, for a current pathway between the hands or between the hand and one foot, is stated to be about 100 milliamperes for shock durations of three seconds or longer for 60-cycle alternating current, and about five times this value for direct current. It was found that the susceptibility of the heart to fibrillate depends on the shock duration and the phase of the heart cycle at the instant the shock is applied. For shocks applied at the most sensitive region of the cardiac cycle, and for a shock duration less than about 0.10 second, the current required to produce fibrillation may be ten times that needed for shocks of three seconds duration. Experiments on animals indicated that repeated shocks were not cumulative in their effect on the heart, and the heart generally responded to normal in about

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five minutes if fibrillation did not occur. The medical profession is of the opinion that once ventricular fibrillation occurs in man, it is unlikely to cease naturally before death.

For 0.03 second shocks, the hearts of sheep seemed to be most susceptible to fibrillation at currents of about six amperes, and less sensitive as the current was either increased or decreased from this value. Fig. 8 was taken from reference (6) to make this point clear. The explanation of this phenomenon is that the muscular contractions produced by these high currents cause such violent contraction of the chest and heart muscles that the heart is held still and fibrillation is prevented. If the shock is of appreciable duration, death is inevitable. However, if the shock is of short duration, the chest and heart muscles relax and the heart may resume its normal rhythm. It is believed that the abdominal massage and accompanying stimulation of the heart caused by the application of artificial resuscitation may be very beneficial in causing the heart to regain its normal rhythm. This is offered in explanation of infrequent accident cases in which victims apparently withstood relatively large currents. This theory is supported by apparent laboratory success in the use of high current counter shocks to arrest fibrillation in animals. Since it is impossible for the layman to distinguish between respiratory inhibition, ventricular fibrillation, and heart failure, he should begin artificial respiration immediately, and summon medical aid as soon as possible.

Relatively large currents, amperes and *not* milliamperes, may produce sufficient heat to destroy nerves, protoplasm, bone and cause hemorrhages resulting in immediate death. Delayed death may be due to burns or other complications. It is encouraging to note that in a majority of cases, victims surviving the initial shock of an electrical accident are not likely to suffer serious after-effects or permanent disability.

Acknowledgements

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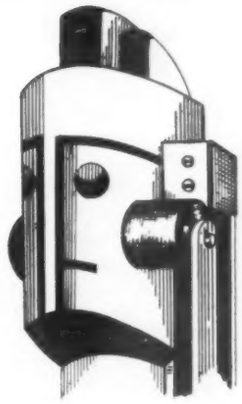
Acknowledgment is given the various persons who volunteered for the experiments. Without their continued interest and cooperation this investigation would not have been possible.

Special thanks are due Messrs. J. L. Thurston, C. J. Manner, J. R. Burch, and S. H. Robley, students in Electrical Engineering, for their assistance both in the laboratory and in analyzing data.

ABC's of Relays



Part 7—Some of the advantages of pilot-wire relaying. Concluding a series of articles on relays and their application

By E. B. Kipp
Westinghouse, Los Angeles

OF ALL the relaying schemes discussed thus far in this series, carrier-current relaying most nearly approached the ideal because it assured rapid clearing of faults with simultaneous operation of the circuit breakers at both ends of the faulted line section.

However, the main deterrent to the widespread use of carrier-current relaying is its cost. The cost is necessarily high compared with other relaying schemes and, in many instances, operating companies have felt that the increased protection afforded by carrier current relaying did not justify the added cost—particularly where the line sections were short.

Several years ago it was found that a relaying scheme based on the differential or balance principle could be applied to some line-sections by using control (pilot) wires between the two stations. From this basic idea many different schemes of relaying were developed but all of them were subject to certain inherent difficulties and only recently have new developments brought the use of pilot-wire relaying to the foreground.

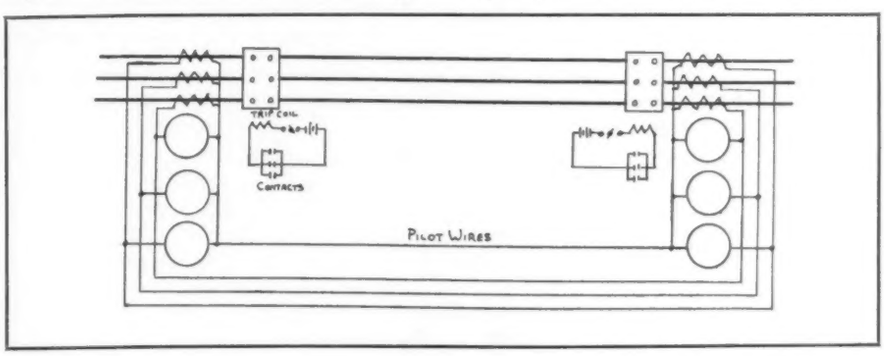
Fig. 1 shows one of the earliest and simplest forms of pilot-wire relaying. It is in effect a simple differential scheme in which the corresponding current-transformer secondaries at opposite ends of the line section are connected in series so load currents and through-fault currents are circulated around the relays. In case of an internal fault, the balance is upset, current flows through the relays at each end, and the associated circuit-breakers are tripped out.

This scheme is extremely simple. It does not require batteries or potential transformers for its operation and will not trip out during power surges (out-of-step conditions). However, its disadvantages are many—the current transformers at opposite ends of the line-section must be well matched, four pilot wires are required, the length of the pilot wire is limited by the burden on the current transformers, the relays will trip due to load current if the pilot wire is accidentally open circuited, and induced currents may cause false tripping. Other schemes operating on the balance principle were developed but all had similar limitations.

Many of these limitations were later overcome by the introduction of a somewhat different protective scheme known as the "directional-comparison" method in which the relative instantaneous directions of the fault currents at the two ends of a line section are compared by means of some communication channel. One form of this relaying method has already been described under the subject "Carrier Current Relaying" (Part 6, January) in which the communication channel consists of a high-frequency current superimposed on the transmission line.

A somewhat simpler scheme using pilot wires is shown in Fig. 2. Under

Fig. 1—Schematic diagram showing a simple pilot-wire relaying arrangement



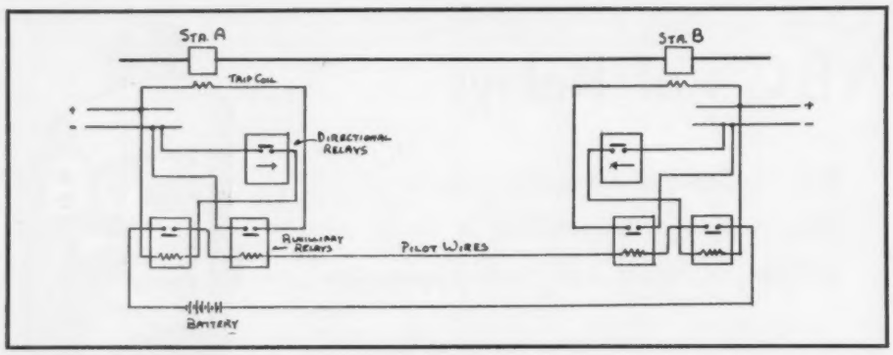


Fig. 2—The elements of a directional-comparing scheme of relay protection

normal conditions, power flow through the line will be in at Station A and out at Station B, or vice versa. With power flow in at A, the directional contacts at A will be closed and those at B will be open. With power flow in at B, the opposite will be true. From the diagram, it can be seen that the trip circuits cannot be completed at either end unless both sets of directional contacts are closed.

If a fault occurs within the line section, power will flow into the line at both ends, the directional contacts of both relays will then close and the circuit breakers at A and B will be tripped simultaneously.

This pilot wire scheme requires only two pilot wires (which can be telephone circuits if desired), does not require matched current transformers, is relatively free from pilot wire disturbances and is suitable for long lines. Its disadvantages are that it requires potential transformers, batteries and auxiliary relays, it trips during out-of-step conditions and may trip incorrectly on some types of faults. Furthermore, since the pilot signal is direct current it is difficult to insulate the associated equipment and protect it against high voltages induced in the pilot line.

Other directional-comparison schemes are more elaborate but most of them use direct current pilot wires and have many of the objections of the scheme shown in Fig. 2.

One of the most recent developments in the relay art is a new a.c. pilot-wire relay (Fig. 3) which has all of the good features of the older schemes and but few of their objections.

Fundamentally, the relay consists of a combination positive and negative sequence filter, a small saturating transformer, two Rectox units, a polarized relay and a neon lamp all mounted in a single case.

The sequence filter consists of a 3-winding iron-core reactor and a number of tapped resistors which combine the currents due to phase-to-phase and phase-to-ground faults and provide a single-phase voltage across the primary of the saturating transformer proportional to these quantities. The saturating transformer is used to limit the voltage impressed on the pilot wire and to provide a small range of voltage for a large range of fault currents.

The secondary of the saturating transformer feeds into a neon lamp, two Rectox units, the insulating transformer and the pilot line. The neon lamp glows at about 60 volts and definitely limits its secondary voltage to this value. The Rectox units convert the a.c. into d.c. for the polarized relay which consists of a two-winding coil that energizes a simple flat-spring armature suspended between the poles of a small permanent magnet. The contact on the moving armature is held open in the de-energized position by a magnetic bias from the permanent magnet. The two coils are wound oppositely, one acting as a restraining and the other as an operating winding. The restraining winding in conjunction with the field from the permanent magnetic normally holds the contact open while the operating winding tends to move the armature to the contact-closing position. Due to the light weight of the moving parts and the small contact travel necessary, one cycle operation is obtained.

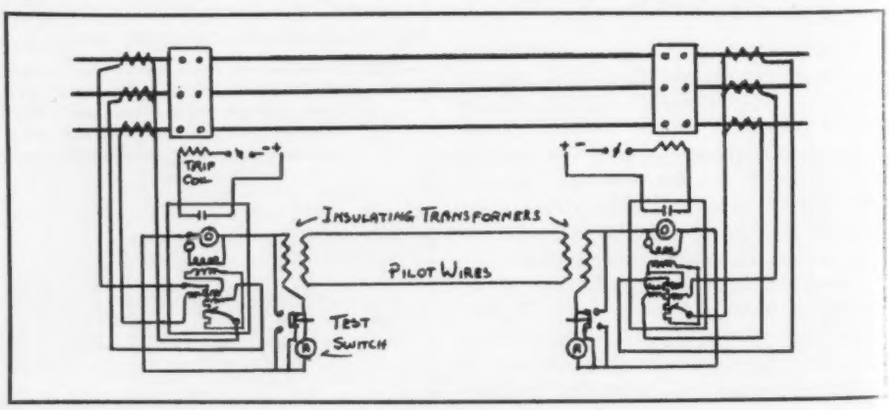
The voltage appearing across the secondary of the saturating transformer is balanced against a similar voltage at the opposite end of the line section, going through the restraining winding of each relay, the insulating transformer and the pilot wire. On through faults (faults outside the line section) the voltage across the secondaries of the saturating transformers are equal and in series and act to circulate current through the restraining coils in series with the pilot wires. Under this condition the operating coils do not receive sufficient current to overcome the restraint so tripping does not occur.

For internal faults with equal feed-in from each end, the voltages across the saturating transformers are in opposition. This results in all the current flowing through the restraining and operating coils in series and none through the pilot wire. The relays at both ends, therefore, operate simultaneously. In effect the relay combines the functions of the schemes shown in Figs. 1 and 2 since it operates as a differential device on small fault currents and as a directional-comparison device on heavy fault currents due to the voltage limiting effect of the saturating transformer and neon lamp.

The main function of the insulating transformers is to isolate the relay equipment from the pilot wire. The transformers are insulated for 5,000 volts and adequately protect the relays from stray or accidental high voltages on the pilot wire.

Since the maximum duty imposed upon the pilot circuit is only about 60 volts and 100 milliamps, and since the telephone interference level is low, leased telephone lines may be used. However, the pilot channel must be kept clear and should not be exposed to excessive induction from parallel transmission circuits since large induced voltages may cause false operations. A shorted pilot wire makes the relays inoperative while an open-circuit allows them to operate as straight overcurrent elements. However, where conditions warrant, a simple supervisory relay scheme can be applied to the pilot wires to promptly indicate any abnormal conditions.

Fig. 3—This diagram shows the newer ratio-differential pilot-wire relay circuit



Range, Water Heater and Refrigerator Data for Western Systems—January, 1941

UTILITY	No. Residential Customers	Av. An. Kw.-Hr. Cons.	—Per Cent Saturation— Ranges	Water Htrs.	Refrig.	Ranges 1940 Sales	Ranges 1941 Quotas	Ranges % Rplmt.	Water Heaters 1940 Sales	Water Heaters 1941 Quotas	Water Heaters % Rplmt.	Refrigerators 1940 Sales	Refrigerators 1941 Quotas	Refrigerators % Rplmt.
Alameda Municipal	10,860	1,261	*	*	*	160	*	*	20	*	*	300	*	*
B. C. Elec. Ry. Co., Vancouver	93,000	1,040	14.2	3.0	14.9	1,148	1,115	30	51	85	10	3,213	3,530	5
B. C. Elec. Ry. Co., Victoria	20,788	834	12.0	2.5	*	197	172	33	19	10†	*	492	450	0
Calif.-Oregon Pwr. Co.	29,119	2,374	—	—	—	3,656	....	..	2,699	....	..	5,500	....	..
Central Ariz. Lt. & Pwr.	25,800	1,124	*	*	*	174	200	10	72	80	*	3,548	2,800‡	40
Eastern Ore. Lt. & Pwr.	6,519	1,044	*	*		242	250	10	144	200	*	775	800	20
El Paso Elec.	22,200	1,180	19.0	12.0	65.0	335	400	2	385	375	.	1,950	2,150	7
Hawaiian Elec.	41,500	1,225	20.0	10.0	72.0	1,250	1,500	6	975	1,150	1	3,750	4,350	33
Idaho Power Co.	57,000	1,950	56.0	26.0	55.0	3,896	3,900	40	1,607	1,800	10	8,557	6,000	15
Los Angeles Bur. P. & L.	418,000	945	5.8	2.4	60.0	6,000‡	5,000‡	3	3,100‡	3,500‡	2	*	*	*
Montana Power Co.	70,000	920	23.0	2.0	*	2,936	3,002	25	287	370	5	8,112	7,990	20
Mountain States Pwr.	51,700	1,345	*	*	*	1,600	....	..	540	....	..	5,400	....	..
Northwestern Elec. Co.	34,236	1,515	41.6	9.7	54.8	2,708‡	2,655‡	25	1,130‡	1,300‡	10	4,951‡	4,075‡	15
Pacific Gas & Elec.	711,734	1,027	9.0	5.0	48.0	5,200	5,800	10	3,100	3,400	6	76,400‡	84,000‡	25
Pacific Power & Lt.	60,950	1,689	20.0	12.0	45.0	2,637	2,779	25	1,588	1,676	2	9,073	9,344	17
Portland Gen. Elec.	124,959	1,518	27.5	10.0	54.0	6,543‡	7,500‡	27	2,960‡	3,750‡	4	11,200‡	11,300‡	20
Pub. Service of Colo.	115,823	759	6.0	*	53.0	652†	780†	5	119†	150†	*	2,898†	3,400†	10
Puget Sound P. & L.	179,760	1,511	32.0	14.0	48.0	9,316	9,300	30	4,931	5,600	8	22,716	22,300	6
San Diego G. & E.	82,936	994	*	*	*	600	600	*	525	550	*	10,700	10,000	*
Seattle City Light	80,500	1,703	46.0	28.0	46.0	5,000	5,000	27	2,975	4,000	15	690†	750†	*
Sierra Pacific Pwr.	13,000	1,591	57.0	17.0	75.0	1,091‡	1,200‡	15	297‡	300‡	3	1,748‡	1,400‡	8
So. Calif. Edison	459,500	980	9.5	4.0	60.0	4,700	5,700	19	1,850	2,200	15	43,857‡	40,000‡	10
So. Colo. Pwr.	20,850	930	22.0	6.0	45.0	560	650	15	243	300	2	2,370	2,300	25
Tacoma Municipal	33,600	2,100	*	*	*	1,670	1,000	*	1,315	1,440	*	*	*	*
Tucson G. E. L. & P.	14,682	988	7.0	*	*	175	175	10	50	50	20	*	*	*
Utah Pwr. & Lt.	105,925	1,212	40.5	6.5	69.0	3,958	3,700‡	30	810	850‡	5	13,919	13,000	30
Washington Water Pwr.	70,340	2,193	29.2	26.7	58.5	4,179	4,900	20	3,287	3,500	20	9,991	10,410	30

* Figures not available. † Company sales only. ‡ Dealer sales only. All other figures represent combined dealer and company sales.

Here in the proverbial nutshell is a condensed tabulation of the major appliance situation on the lines of the major Western utility systems. In the light of 1940 sales accomplishments the job set up for this year is not difficult provided the manufacturers can supply the stocks. There are some noteworthy figures in the table—the record range saturations on the Idaho Power and Sierra Pacific lines; the water heater figures for Seattle City Light, Idaho Power and Washington Water Power; the average annual consumption figures for most of the systems. There is still a great sales opportunity for refrigerators if the low saturation figures are brought up to meet the high levels on several systems.

Ranges - Water Heaters - Refrigerators - a Resume

THIS year 1941 is going to be a record one for Westerners in the major appliance business. Why? Take a look at the quotas that have been set for the eleven Western states: ranges, 76,250 units; water heaters, 39,350 units; refrigerators, 368,000 units. That's big business for the utilities, the manufacturers, distributors, dealers, salesmen and even for the contractors.

For the power companies it means increased consumption, larger revenues and lower rates for their customers. The dollar volume represented by the totals will influence the profits of manufacturers, dealers and distributors. Contractors will benefit because both ranges and water heaters involve installation work.

This being so, then a quick resumé of trends, policies, market conditions and plans is important. That is the purpose of this annual investigation which ELECTRICAL WEST conducts. A score of top utility commercial men were asked to give the industry the benefit of their ideas and experience. What follows constitutes summaries, interpretations and quotations from their remarks.

Policies

Few changes in policy have occurred during the last year. Two companies—Utah Power & Light and Puget Sound Power & Light—stopped direct sales of major appliances and turned to a program of 100% dealer cooperation. Those utilities which have found a happy medium that permits active merchandising on a basis that induces and stimulates dealer selling as well continue to function. Companies which subscribe to complete dealer cooperation have modified their systems to meet changing conditions. Here are a few comments:

"Under our particular method of operation we do not employ the use of utility-inspired promotional campaigns, competitive contests or special pressure selling periods. On the contrary, the answer to the problem, to our minds, is consistent day-by-day selling methods and the use of a normal amount of advertising."

"Range and water heater sales should increase in direct proportion to the increased number of dealer outlets established, the tendency for lower rates and the tendency of unit prices downwards. These, combined with aggressive customer contacts by well trained salesmen, are the basic factors which should go a long way toward producing outstanding results."

"In the absence of any spectacular activity featuring special incentives for short periods, either in the form of an incentive to the salesman, dealers or the public, the only satisfactory way we know of promoting range and water heater business in volume is a selective selling program with the proper ratio of good field salesmen to the number of prospects available."

"We need more well established reliable dealers who are enthusiastically working on an adequate margin of profit rather than so many small irresponsible dealers who are solely interested in some profit per transaction. If this is accomplished through regular trade channels, the sale of these appliances would appear more attractive to the well established and aggressive business firms."

Outlook

Universal optimism is expressed over the 1941 outlook except for one big IF—sales executives predict record sales

provided manufacturers can supply the stocks. Many point to this as the one possible bottleneck. However, it is still a matter of opinion. No concrete examples of shortages were cited. All hope that the fear will not become a fact. Here are some opinions:

"Sales will materially exceed 1940. In the month of January electric range sales were 39% above January, 1940, and water heater sales were up 56%. With the very handsome lines of ranges and water heaters available; with their present attractive retail prices; and with the very fine acceptance of these devices by dealers, we believe that 1941 will be the best year yet."

"With the tremendous expenditures for national defense, it is believed that every industrial center will be operating at near capacity. This should result in substantial decreases in the ranks of the unemployed and should provide greatly increased purchasing power generally. This should create markets for agricultural products produced in the Northwest and the spread of this income should have a material effect on the ability of the public to buy electrical appliances."

"We are of the opinion that the sale of these appliances will be from 15 to 20% better than in 1940."

"Surveys indicate that January reports will show one of the best months in the history of this business. Succeeding months should be pretty much a repetition of last year's excellent results."

"It is the general belief of dealers that 1941 will be the greatest year that we have ever experienced in this district for the sale of major appliances and we are hoping to exceed all previous years."

"Considering the major appliance outlook for 1941, it is my opinion that sales will run just about 10% above 1940 provided we meet no difficulty in securing deliveries."

"The sales of major appliances in 1941 should show an increase of 20% over 1940 in our territory."

"We can look forward to 1941 as being an outstanding appliance year. The only qualification that should be made is that there may be some difficulty in obtaining stock to sell."

Campaigns

There will be plenty of intensive merchandising and promotional effort put behind major appliances in this territory throughout the year. Campaigns reported range from spectacular sales drives such as those of southern California utilities on the one hand, and Pacific Gas and Electric Co. on the other as reported on the following pages, to drives featuring one manufacturer's product. The Modern Kitchen Bureau promotional activities will have a number of supporters in this area, both on ranges and water heaters.

With few exceptions all special customer inducements are restricted to campaign periods. Free wiring has almost disappeared. So too have trade-in allowances. Several companies are sharing the cost of dealer advertising on ranges and water heaters. The newspaper cooperative cooking school has lost none of its popularity and many will be held in various Western cities.

Trends

There have been no spectacular trends in major appliance merchandising. The basic fundamentals of good merchandising appear to be the things that produce results. A better class of salesmanship seems to be a definite need. Several people point to the difficulty that dealers have in securing and retaining competent, well-trained salesmen.

Unfortunately there seems to be neither agreement nor very adequate plan to cope with this problem. No two companies quite agree on whose responsibility it is to secure and train the competent salesmen needed. The only sure thing is that something will have to be done on that score in the face of trends, especially the present direction toward more dealer selling.

Among the more interesting comments made in respect to the range and water heater picture are these, each of which contains an important thought and poses a possibility that may well bear further study:

"If the distributor would take the time and effort to study the dealer's problem and work more closely with him, the general appliance business would not only be greatly increased but a more cooperative feeling would exist between the dealer and the distributor."

Combination gas and electric companies, according to another revealing sidelight, are finding their own gas efforts regurgitating.

"In our position of a combination gas and electric property," says one, "it is hard for us to be very philosophical about the range and water heater situation because the promotion and advertising we have done for gas cooking, water heating and house heating has been used to exceptional advantage in our straight electric territory by the Butane people."

One of the most fruitful innovations of the past year has been the institution of an all-electric rate in Seattle by both utilities. That it has unique potentialities for loadbuilding is best expressed in the comments of P. C. Spowart, sales manager of Seattle City Light.

"We believe the all-electric rate which we inaugurated last July 15 is the greatest stimulus to the range and water heating business that this or any other utility has ever experienced.

"City Light's all-electric rate offers 370 kw.-hr. or less for $5 a month, all over 370 kw.-hr. at 0.7c per kw.-hr. This is applicable only to single family residences supplied through a single meter, where electricity is the only means of lighting, cooking and water heating. Storage tanks must be insulated and of 40 gal. minimum capacity, heated by two non-inductive, thermostatically controlled elements with a maximum capacity of 50 watts per gal. of tank capacity for the upper element, and 25 watts per gal. of tank capacity for the lower element.

"This rate is based on the premise that low rates, plus intensified sales effort on major appliances, will increase customer volume use and thus bring revenues back to normal or beyond. It encourages full use except for air heating. Its main purpose is to build load through the installation of the two-element storage type water heater.

"Considerable education must precede the water heater installation to make its use attractive at competitive rates, and the tank sale should either accompany or closely follow the range sale. When a customer is in the market for either a tank or a range, the all-electric rate is a potent factor in persuading him to install both. The installation cost, of course, is thus reduced also.

"The all-electric rate has exceeded in value the expectations of the most optimistic. During the last six months of 1940 while this rate was in effect more tanks by 60% were put on our lines than during the entire previous year. Range sales exceeded those of any other year with the dealers taking a most active part and showing a greater interest in electric equipment than ever before. This all-electric rate has been the biggest obstacle to gas equipment sales known in this city. So great has been the influx of requests for the all-electric rate that an increase in our service division and clerical force has had to be made to cope with it. Everything indicates it will be the greatest force in load building used to date."

A fitting last word on the subject is made in another comment:

"Each year ranges and water heaters have been lower in price, higher in efficiency, better in appearance and usability, and the demand for them has been continuously growing stronger. What really is needed then is nothing more than intelligent advertising and good salesmanship. But this thought is not new; it is simply the basic fundamental of all merchandising."

$30 Discount Range Campaign

Pacific Gas and Electric and distributors for thirteen makes of electric ranges set up two-month cooperative dealer promotional program for ranges and water heaters

A DISCOUNT of $30 on ranges and $10 on water heaters will be made the major inducement of the 1941 Spring electric range and water heater campaign in northern California. Pacific Gas and Electric Co. and the distributors of 13 makes of ranges and 10 water heaters will combine efforts to return such a discount to dealers to pass on to their customers. These discounts are in addition to any turn-in allowance and in lieu of a wiring allowance.

The campaign runs from Mar. 1 to Apr. 30 inclusive in both Pacific Gas and Electric Co. and the San Joaquin Power Division territories.

"Designed to build plus business for every dealer who gets behind it," said O. R. Doerr, general sales manager, in announcing the campaign, "this promotion undoubtedly will be the biggest two-months' sales drive on these two appliances in the history of this part of the state. The entire industry is solidly behind the promotion, which provides more buying incentive and more selling tools than we have ever had available at one time before."

Qualifying ranges and water heaters must be sold during the campaign period and installed on or before June 30. Participating and qualifying makes of ranges and water heaters include Frigidaire, General Electric, Hotpoint, Kelvinator, L & H, Monarch, Thermador, Westinghouse and Norge ranges and water heaters; Estate, Gibson, Universal and Florence ranges; and Wesix water heaters. Especially priced closeout models or other reduced price merchandise will not be advertised or publicized in any way during the campaign nor the two weeks' prior to the campaign. To qualify, the range or water heater must carry the same retail list price which prevailed 30 days prior to the opening date.

The special inducements offered are shared jointly by the dealer, distributor and power company. At the conclusion of the campaign, the dealer invoices his source of supply in the amount of $18 for each range and $7 for each water heater qualified for the discount. Special forms are prepared for the purpose of reporting and final checking on the installations. From these forms, Pacific Gas and Electric Co. reimburses the supplier $6 for each qualifying range and $5 for each water heater.

Cooperative Advertising Plan

Advertising and promotion support of the campaign will be on a larger scale than anything hitherto used in that region. Coincident with the announcement of the campaign was the announcement of a new cooperative newspaper advertising plan on ranges and water heaters for the entire year. Under this plan, the company pays one-third of the space cost of retail dealers' and wholesale suppliers' newspaper advertising copy devoted exclusively to qualifying electric ranges and water heaters. Under its terms, electric ranges must be new, at least 6 kw. capacity, equipped with closed surface units and enclosed type switches. Water heaters must be new, insulated storage type, a minimum element capacity of 3 kw. and water storage capacity 18 gallons. Advertising must be run in daily or weekly newspapers which regularly carry P G and E schedule of advertising or located in cities and towns where the company distributes electricity. San Francisco is excepted from this schedule.

For the period of this special campaign, not only will P G and E pay one-third of the space costs, but most of the wholesale suppliers have agreed to pay one-half of the total space costs of the qualifying ads, leaving only one-sixth of the total cost for the dealer to pay.

Newspaper advertising from the company will include 6,390 column inches in 51 daily and 14,500 column inches in 248 weekly newspapers in cities throughout the system with the exception of San Francisco. Billboards will be located at strategic points on highways emphasizing to the buying public the saving of $30 and $10 or a total of $40 on the combination of range and water heater. Bill stickers on 475,000 electric bills will go out and quantities of envelope inserts are provided to dealers for their own use.

A free window display service is offered to dealers in cities outside of San Francisco, Oakland, Berkeley and Sacramento or the Humboldt division and in even these divisions campaign display posters will be available. The free display service is available to dealers upon call to their local P G and E representative.

For dealer advertising a free mat service is being offered by the supplier of ranges. Free mats of the campaign inducements have been prepared by the P G and E and are available from its offices or the newspapers.

Another big inducement to be stressed is the new low rate; "1c-electricity is here" is one of the campaign slogans. Customers pay only 1c or less for all electricity used in excess of 200 kw.-hr. per month anywhere on the system, it is to be emphasized.

The inducement offer holds good in San Francisco although no advertising of it nor cooperative advertising on ranges and water heaters will be done by the company there because of the pending leasing deal with the city of San Francisco.

One of the biggest billboard showings on electric ranges ever to cover boards in southern California will carry the "One Out of Four" message that features electric range campaign sponsored by cooperating utilities and range manufacturers

Become "One Out of Four"

So say dealers, utilities, manufacturers and distributors in March drive aimed at selling 3,500 electric ranges in southern California area. Termed the electric Range Popularity Sale, campaign features free aluminum cooking set premium

JOINING in an all-industry, history-making electric range campaign, southern and central California dealers, manufacturers, wholesalers and utility companies are staging during March the biggest range sales drive the area has ever known.

"Big news" in many ways, the campaign is an outstanding accomplishment in industry cooperation, a milestone in the desirable coordination of the activities of various parts of the same branch of the industry into one forceful forward push for more sales.

Territory in which the sale is being conducted includes the service areas of the Southern California Edison Co., Los Angeles Bureau of Power and Light, Glendale Public Service Dept., Burbank Public Service Dept. and the Pasadena Municipal Light and Power Dept.—a region in which business is booming, farm income is rising and national defense industrial activities are putting many new dollars into consumers' pockets.

Rich in public appeal, the campaign is termed an Electric Range Popularity Sale. It is based on the psychologically clever premise of the widespread growing acceptance of electric ranges, impressing the customer with the fact that while a few years ago only one out of 15 women was changing to electric cooking, today one out of four is switching to a modern electric range. This disclosure, which is news to many customers, is making them realize that the nation-wide trend to electric cooking is making it more than ever the accepted modern way to cook.

With any 1941 model electric range purchased during the sale, buyers are offered a free eight piece "Wear-Ever" aluminum cooking set with a retail value of $14.75. The set includes three sauce pans, two layer cake pans, chicken fryer, Dutch oven and pie pan, all of the latest design. Cost of the set is paid by the wholesalers.

Wiring Allowance Uniform

Special terms of as low as 15c a day are offered during the Popularity Sale. Range prices are quoted installed. The wiring plan operates on the payment by the utility companies of $20 for a range installation, a uniform policy agreed upon last summer. Since the average cost of installing an electric range is about $35, wholesalers are pricing ranges to include a $15 allowance to cover wiring. This $15, plus the $20 paid by the utilities, takes care of range installation in most cases and enables the dealers to quote ranges installed, eliminating one of the obstacles to range selling. The dealer pays no part of the wiring cost.

The customer has freedom of choice of any 1941 model of Frigidaire, General Electric, Gibson, Hotpoint, Kelvinator, L & H, Stewart-Warner, Thermador, Universal or Westinghouse ranges.

Complete, forceful and colorful is the advertising background of the range

PRINT IN BINDING

ELECTRICAL WEST Sales Guide

Here's a Recipe for Range Sales Too!

To the woman's desire for clean, good looking kitchen appearance, add the man's respect for high class mechanical equipment, throw in a dash of a man's pride in his ability to cook some special dish better than anybody else in the world, and you have the makings of an electric range customer.

Another good recipe—Take the trend toward electric cooking of the past few years, add to it a pinch of remembrance of the switch from oil or gas lamps to electricity, expose prospects to the fact that **one** out of **four** ranges bought last year were electric as against one in fifteen just six years ago, and you have the ingredients for a switch to switches too.

Both of these recipes will be used throughout the entire year to stir up good range prospects for you. Everybody is doing it. All the range manufacturers in their national and local advertising. Your local utility or electrical league in its range promotion too. The Modern Kitchen Bureau in its national ads and in the wealth of material you can obtain from it to use in your own selling. All will tell this same story. Tell it too—make it work for you.

ELECTRIC RANGE

MARCH 1941

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218th Field Artillery, Hq. 1st Bn. 218th F.A., Fort Lewis, Wash.

Puget Sound P & L

BAILEY, PARK WILLIS, distribution engineer—Captain, 7th Infantry, Vancouver Barracks, Vancouver, Wash.

BARCLAY, WALTER P., senior general bookkeeper—Captain, 146th Field Artillery, Fort Lewis, Camp Murray, Wash.

BAUER, WOLFFRED, clerk—Lieut. J. G., 13th Naval District, Seattle, Wash.

EDWARDS, WARREN CLAY, auto records clerk (gen'l acctg.)—1st Lieut., 15th Infantry, Fort Lewis, Wash.

FULLER, ANDREW B., draftsman—Lieut. J. G., 13th Naval Dist., Seattle, Wash.

HUDSON, ARTHUR J., waterheater inspector—Captain 116th Q.M. Corps, Fort Lewis, Wash.

HUNT, ORLAND G., jr. res. contract salesman—1st Lieut., 146th Field Art., Fort Lewis, Wash.

NICHOLS, JEROME J., clerk (acctg. dept.)—Lieut. J. G., 13th Naval District, Seattle, Wash.

REED, JACK B., messgr.—2d Lieut., 75th Coast Artillery, Anchorage, Alaska.

VAN WICKLE, JAMES M., sr. office clerk—Captain, 161st Infantry, Fort Lewis, Camp Murray, Wash.

WILTAMUTH, RALPH H., messenger—1st Lieut., 53rd Infantry, Camp Ord, Calif.

WRIGHT, HOWARD, local manager—Lieut.-Col., Coastal Defenses, Fort Worden, Wash.

BLACK, THOMAS E., jr. engineer, 1st Lieut., Engineers, Fort Belvoir, Virginia.

KAYE, ALBERT, office clerk, 1st Lieut., Engineers, Fort Belvoir, Virginia.

ROWELL, IRVING H. voltage inspector—Captain, Coast Artillery, Fortress Monroe, Hampton Roads, Virginia.

Tacoma City Light

HAIRE, ARNOLD E., substation operator—Ensign, mine-sweeping school, Norfolk, Virginia.

Utah P & L

BALLARD, RULON J., engineer—Captain, Engineer Reserve, Ogden Supply Depot, Assistant Construction Quartermaster.

COWLES, HARPER B., commercial sales—Captain, Field Artillery, University of Utah, R.O.T.C.

HOWARTH, G. A., industrial sales—Captain, Engineer Reserve, Ogden Ordnance Depot, Assistant Construction Quartermaster.

AMOTT, L. G., statistician, rate department—Captain, Field Artillery, Fort Sill, Okla.

SILVER, RICHARD M., evaluation department—2nd Lieut., Quartermaster Res., Philadelphia, Penn.

Washington Water Power

ASTON, LOUIS C., Spokane division sales—Captain, HQ Co., 161st Infantry, Camp Murray, Wash.

KLUCKHOHN, ROBERT H., personnel department—2d Lieut., 161st Infantry, Camp Murray, Wash.

MURPHY, MATTHEW, engineering department—Captain, to command and general staff school, Fort Leavenworth.

SHERRER, FRED, electrical shop—2d Lt., Engineers' Corps, Fort Murray.

Deaths—

Dick Smith succumbs after long illness

Death came to end the lingering illness of Richard E. Smith, executive assistant, Southern California Edison Co., on Dec. 8. Known best as Dick Smith, a quiet, effective and thorough arranger of PCEA convention programs and Los Angeles Electric Club affairs, a person gifted with an unexpected flare for drama, he had been selected to be general convention chairman for next year's PCEA convention at Coronado.

Born in Merrill, Wis., March 31, 1885, Dick Smith came to California with his parents as a boy. He attended Lick-Wilmerding High School in San Francisco, and began in the electrical industry as a helper in an electrical contractor's shop in San Diego. In 1915 he

DICK SMITH

started as a lighting sales engineer for Pacific Light & Power Corp., in Los Angeles, and shortly afterward was appointed sales manager of Mt. Whitney Power & Electric Co. in the San Joaquin valley. He was in Tulare when that company was merged with Southern California Edison Co. in 1917.

In 1919 he was transferred to the Edison general office in Los Angeles and in 1922 made advertising manager.

A new position, that of executive assistant, was created for him in 1932, so that he could lend his talents of expression and human relations to the management officers. This position gave him the opportunity also to participate, always modestly in the background, in the employee information and public relations programs of the PCEA.

Active in the Los Angeles Electric Club, he was its president in 1923-24; and of the Rotary Club in 1938-39. His influence, however, could hardly be measured in terms of positions held or things belonged to. If a skit were to be written, a program arranged, or some unusual service performed, he was given the task and performed it with whimsical humor and understanding.

For ELECTRICAL WEST he had often written, indeed was numbered among Electra's Husbands, in fact was an originator of that now regular page, which shall miss his contributions. He will be missed everywhere.

Charles Higson, distribution superintendent, dies

Charles Roy Higson, 57, who rose from a substation operator to superintendent of distribution for the Utah Power & Light system during his 28 years with the company, died December 18 at his home in Salt Lake City. Mr. Higson, since January, 1940, had been consulting engineer, having given up his superintendency because of poor health.

After his graduation from the University of Wisconsin, he was employed by G-E at Schenectady. Two years later he became an instructor of electrical engineering at the University of Wisconsin. He joined Utah P & L in 1912.

● ORVILLE JOHNSON, for 22 years with Graybar Electric Co., in its San Francisco and coast valleys districts, and finally as lamp and lighting department manager, San Francisco, died Dec. 5, 1940, after a prolonged illness. Active in electrical industry affairs as well as fraternal organizations, his passing was mourned by a large circle of friends.

● GEORGE ROSS RANDALL, prominent electrical contractor-engineer of Salt Lake City, died November 25 of a heart ailment. Mr. Randall, at the time of his death, was manager of the Salt Lake Electric Co., which he founded in 1910. One of the founders and organizers of the Electrical League of Utah in 1919, he served as president in 1926.

● FRANK CROLEY, for some years Silvray representative in Southern California, died Nov. 9, 1940.

From Telephone Wire to

OVER 60 TYPES OF

ROEBLING (JR) ELECTRICAL

WIRES AND CABLES

Rubber Covered Wires and Cables: Code; Performance; and Heat Resisting; Plain Rubber 60% sheath Power Cable and 40% and 60% sheath Flexible Cords

Power Cables: Paper; Cambric; Rubber

Parkway Cable, metallic and non-metallic

Service Entrance Cable

Slow-Burning Wires and Cable

Weatherproof Wires and Cable

Police-Fire Alarm Cable

Appliance Cords

Annunciator and Blasting Wire

Network Cables

Magnet Wire

Welding Cables

And a wide variety of other wires and cables; either Standard or to Customer's Specifications

QUICK SHIPMENT

Prompt Service is available at all offices and warehouse points listed below, where large stocks of a wide variety of standard Roebling Wires and Cables are always on hand. Your request for information, prices or samples will be welcomed.

JOHN A. ROEBLING'S SONS CO. OF CALIF.
San Francisco, Los Angeles, Seattle, Portland

ROEBLING

One of the biggest billboard showings on electric ranges ever to cover boards in southern California will carry the "One Out of Four" message that features electric range campaign sponsored by cooperating utilities and range manufacturers

Become "One Out of Four"

So say dealers, utilities, manufacturers and distributors in March drive aimed at selling 3,500 electric ranges in southern California area. Termed the electric Range Popularity Sale, campaign features free aluminum cooking set premium

JOINING in an all-industry, history-making electric range campaign, southern and central California dealers, manufacturers, wholesalers and utility companies are staging during March the biggest range sales drive the area has ever known.

"Big news" in many ways, the campaign is an outstanding accomplishment in industry cooperation, a milestone in the desirable coordination of the activities of various parts of the same branch of the industry into one forceful forward push for more sales.

Territory in which the sale is being conducted includes the service areas of the Southern California Edison Co., Los Angeles Bureau of Power and Light, Glendale Public Service Dept., Burbank Public Service Dept. and the Pasadena Municipal Light and Power Dept.—a region in which business is booming, farm income is rising and national defense industrial activities are putting many new dollars into consumers' pockets.

Rich in public appeal, the campaign is termed an Electric Range Popularity Sale. It is based on the psychologically clever premise of the widespread growing acceptance of electric ranges, impressing the customer with the fact that while a few years ago only one out of 15 women was changing to electric cooking, today one out of four is switching to a modern electric range. This disclosure, which is news to many customers, is making them realize that the nation-wide trend to electric cooking is making it more than ever the accepted modern way to cook.

With any 1941 model electric range purchased during the sale, buyers are offered a free eight piece "Wear-Ever" aluminum cooking set with a retail value of $14.75. The set includes three sauce pans, two layer cake pans, chicken fryer, Dutch oven and pie pan, all of the latest design. Cost of the set is paid by the wholesalers.

Wiring Allowance Uniform

Special terms of as low as 15c a day are offered during the Popularity Sale. Range prices are quoted installed. The wiring plan operates on the payment by the utility companies of $20 for a range installation, a uniform policy agreed upon last summer. Since the average cost of installing an electric range is about $35, wholesalers are pricing ranges to include a $15 allowance to cover wiring. This $15, plus the $20 paid by the utilities, takes care of range installation in most cases and enables the dealers to quote ranges installed, eliminating one of the obstacles to range selling. The dealer pays no part of the wiring cost.

The customer has freedom of choice of any 1941 model of Frigidaire, General Electric, Gibson, Hotpoint, Kelvinator, L & H, Stewart-Warner, Thermador, Universal or Westinghouse ranges.

Complete, forceful and colorful is the advertising background of the range

PRINT IN BINDING

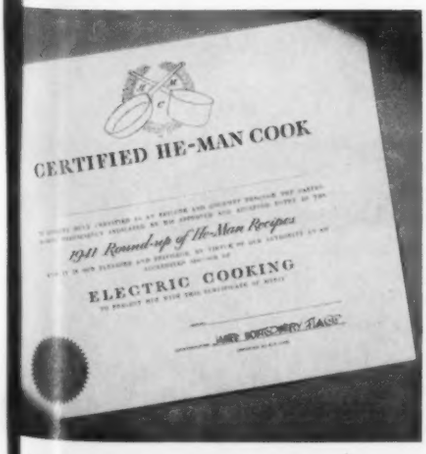
ELECTRICAL WEST Sales Guide

Here's a Recipe for Range Sales Too!

To the woman's desire for clean, good looking kitchen appearance, add the man's respect for high class mechanical equipment, throw in a dash of a man's pride in his ability to cook some special dish better than anybody else in the world, and you have the makings of an electric range customer.

Another good recipe—Take the trend toward electric cooking of the past few years, add to it a pinch of remembrance of the switch from oil or gas lamps to electricity, expose prospects to the fact that **one** out of **four** ranges bought last year were electric as against one in fifteen just six years ago, and you have the ingredients for a switch to switches too.

Both of these recipes will be used throughout the entire year to stir up good range prospects for you. Everybody is doing it. All the range manufacturers in their national and local advertising. Your local utility or electrical league in its range promotion too. The Modern Kitchen Bureau in its national ads and in the wealth of material you can obtain from it to use in your own selling. All will tell this same story. Tell it too—make it work for you.



ELECTRIC RANGE

MARCH 1941

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ELECTRIC RANGE

Selling is fun

WHEN YOU KNOW YOUR STUFF!

Switch selling slants t

When you get somewhere with it, it's fun to sell. You like to feel a "give" as you proceed with your persuasion. May take finesse, maneuvering, patience and skill. But there's real satisfaction in closing.

Worst hazard in the road is your own tendency to go stale on it. But the way to cure a bad case of the stales is to switch your sales slant—

Turn your "persuaders" over and give them a new polish of enthusiasm. Put a new twist on the old fundamentals. Same dice, maybe, but give them a curve as you throw. You'll enjoy the way they go back to work for you.

This year the slant definitely is going to be "switch to switches," or words to that effect.

The way public acceptance of electricity as the cleanest, safest, smoothest manner of doing things has grown during the last few years will be swept along at even quicker pace.

That **one out of four** now buy electric shows the way the tide is going. It is a signal to your prospect to switch to electric switches too, **now,** and be really modern tomorrow as well as today.

Competition never was keener — but that makes the game more zestful. Other fuel ranges have snapped up their models to look like electric, gadgeted them up to act as near like electric as they can.

They even borrow electricity for lights and clocks because they cannot find any substitute as good. But the electric range still has DIFFERENCES and **performances** that cannot be imitated with anything other than electricity.

These differences, these extra performances over the well advertised 21, **can** be sold. They can be sold even over price appeals and flattering imitations. All the superiorities claimed for them are superiorities to old type fuel ranges. Electric ranges have all of these superiorities, **plus** still others unique to electricity.

So slant up on these **extras.** Switch to these **differences** that are worth more. Perform on these **super-performances.** Make more profitable sales with these slants:

Cleaner because it's like electric light, pure energy refined of smoke and waste at the power house and delivered 100% clean. That means a cleaner kitchen, pots and pans, silver and polished metals, drapes and home furnishings, cleaner air.

the "differences"

Faster than anyone will ever need, fast as any fuel without the flame. It is fast with safety.

Lower temperatures still. Great virtue is claimed lately for low temperature cooking. Electricity can maintain lower temperatures still, and with absolute safety.

More reliable because its automatic operation is a natural characteristic. Electrical control is used so completely in the field of industry for intricate, accurate and reliable results. It is the tops of what science can offer, applied to the home cooking machine for the simplest, surest performance.

More adaptable. The electric range can be placed anywhere in the kitchen, regardless of flues. Any other fuel, for health's sake, should be vented to a flue. The electric has no combustion, does not require it. It can be built into cabinets and kitchen counters with perfect safety. Clever new arrangements often plan it in the middle of the kitchen, for instance.

Longer lasting because electric heat is kinder to the metals confining it, does not burn them up. The very way it applies heat preserves oven linings longer, for instance.

Tastier cooking, jucier meats, better vegetables, more mineral salts and vitamins retained, flavors preserved with controlled, low temperature cooking. Even surface units can be time-controlled on new electric ranges. The cooker wells add still finer cooking possibilities.

These are some of the **extras,** the **differences** to sell.

Always there are the basic advantages of coolness in summer, automatic operation that permits freedom, beautiful styling, new economy with more efficient operation and lower utility rates than ever.

Use them all to sell **tomorrow's way** of cooking **today.**

and We'd like You to Succeed at it!

PUGET SOUND POWER & LIGHT CO. . WASHINGTON WATER POWER CO. . PORTLAND GENERAL ELECTRIC CO. CALIFORNIA OREGON POWER CO. . UTAH POWER & LIGHT CO. . IDAHO POWER CO. . THE MONTANA POWER CO. . ROCKY MOUNTAIN ELECTRICAL LEAGUE

"Stuff" to Know

More sales tools ready

Talk about mobilization, everything is being organized this year to make it the greatest year in electric ranges in all time. There are local campaigns to tie in to in almost every locality. Your utility will tell you the details and most likely furnish promotion material, sales helps, home service and cooking schools. If it doesn't the manufacturer of your makes of ranges probably will.

There are available some of the cleverest movies ever furnished, made with high class professional talent. There are movie trailers for your neighborhood theater screen. There are sound-slide films for individual selling and for sales training. Ask your distributor about them.

Advertising of electric ranges will go further this year than ever before—more women's magazines, more popular national magazines, more home and garden publications. Architects will be sold the complete electric kitchen idea. Even husbands will be appealed to in "Famous recipes from famous men."

There is a wealth of display material—visualizer kits, local advertising mats and mailing pieces, cooking school novelties, etc.

Never was a campaign so well implimented, so well organized for supplies. And the ranges themselves are handsomer, have more features, more services to offer than ever before.

Truly this is the year to go to town on electric ranges, water heaters, kitchens. It is the all-out electric range year.

Toasters always pop up

Whether you sell any major appliances or not there is one kind of electric cooking appliance that is always selling—the automatic toaster. Long ago electricity took over the job of toasting almost entirely. Nearly every home has a toaster just as nearly any kind of a store sells them.

Why not make some profit out of this universal acceptance by selling the **automatic** toaster instead? There is more money in it for you, and more satisfaction in it for the customer. Last year, manufacturers' figures revealed that non-automatic electric iron sales dropped while automatic iron sales increased. The same is true of toasters.

In case the special advantages of the automatic toaster over the ordinary have slipped your memory, here they are, ready to be put to selling:

(1) Perfect toast every time (2) No watching and waiting necessary (3) Saves bread, for none is burnt and wasted (4) Keeps the toast warm until wanted (5) Uses current only while it is toasting and so is economical (6) Better quality materials are built into it and it lasts longer (7) Classier appearance because it is styled (8) A wonderful aid in entertaining (9) Pride in having the latest and best (10) It makes such a thoughtful, useful gift (1) Even the children can operate it successfully and safely (12) It is useful for every day and it is dressy for an occasion.

With such a wealth of special benefits it is comparatively easy to step up the sale to an attractive tray set. Such a sale really means something to you both in profit and satisfaction.

Keep in Hot Water too

Increase your unit sale by combining the water heater with the range sale whenever you possibly can. Combined on one contract they are easy for the customer to buy at once on slightly extended terms but at little or no increase in payment. Low prices these days make it more necessary to sell more units—and this combination is a natural.

"Stuff" to do

campaign. Virtually uniform promotion is being used by the campaign sponsors, and the material contains every essential for a comprehensive, successful promotion. In use are the advertising media of newspaper, direct mail, radio, outdoor and dealer store display.

Large and compelling newspaper advertisements are being run by the utilities, accompanied by dealer tie-in advertisements. Utilities are supplying newspapers with small mats of the Popularity Sale headline for use in dealer advertising. Many enterprising publications have sold special display advertising pages featuring the sale.

Leading direct mail piece in the campaign is a four-page standard newspaper size broadside mailed by utility companies to prospects. Packed with sales arguments and popular sales atmosphere, it is capturing much favorable attention. Also in use in the direct mail field are consumer publications and bill enclosures.

A large number of striking 24-sheet billboards are placed in strategic locations to remind customers of the sale. Many are on illuminated boards, assuring both day and night effectiveness to this phase of the advertising campaign.

Dealers are supplied appropriate point-of-sale material by utility companies, including a big three-color banner, 10 ft. x 2½ ft., suitable for either exterior or interior use. Another piece is a poster picturing the free aluminum set, designed for show window display. Price tags were also provided.

Attractive counter display cards were given dealers by the Wear-Ever Co.

Radio "spot announcements" are being used by the Edison Co. to help reach every customer in its far-flung service territory. Catchy and effective sales messages featuring prominent radio talent are being broadcast over KTMS and KDB, Santa Barbara; KVOE, Santa Ana; KFXM, San Bernardino, and KTKC, Visalia.

Dealer Rallies

An important campaign advertising piece in Edison service territory is the "Dealer News," addressed to dealers to give them full details of the sale and the part they can play in it. This profusely illustrated piece was distributed to men attending the dealer rallies held in February.

These dealer meetings, an outstanding unit in the campaign, were sponsored by the Edison Co. and the Los Angeles Bureau of Power and Light. The latter's schedule included:

Feb. 17, Highland Park; Feb. 19, North Hollywood; Feb. 21, San Pedro; Feb. 24, Matchless Home, Wilshire Blvd.; Feb. 26, Slauson and Vermont office. The program at each meeting included M. J. Murphy, outline of campaign; L. R. Scofield, range selling; C. R. E. Germaine, advertising campaign, all of the Power Bureau; E. J. Baughman, Hotpoint, water heater selling.

Edison's dealer rallies, at which attendance totaled 1,000, followed this schedule: Feb. 17, San Bernardino, Chris Griffin, chairman; Feb. 18, Altadena, E. L. Williams, chairman; Feb. 19, Huntington Park, E. W. Isenhower, chairman; Feb. 20, Santa Ana, H. H. Fogwell, chairman; Feb. 21, Santa Monica, Ross Hartley, chairman; Feb. 24, Santa Barbara, H. D. Conklin, chairman.

Special feature of the Edison dealer meetings was the appearance of Dr. G. W. Allison of the Modern Kitchen Bureau, who came from New York to give an inspirational talk in his customary entertaining style. The rest of the Edison dealer rally program included "Why a dealer should sell electric ranges," W. H. Dudley, Frigidaire Corp.; "Why a dealer should sell electric water heaters," Major Anderson, Edison G. E. Appliance Co.; outline of the campaign, H. C. Rice, Edison Co. manager of domestic sales; campaign advertising and promotion, R. G. Kenyon, Edison Co. advertising manager. A buffet supper, with wholesalers as hosts, followed each meeting.

Pasadena and Glendale dealers and salesmen attended the Edison meeting in Altadena. Burbank dealers attended the Bureau of Power and Light's dealer rally at North Hollywood.

Recognition for the success of the admirably coordinated campaign is due the following committee which has directed its activities:

H. C. Rice, R. G. Kenyon, Edison Co.; E. M. Frellson, G. E. Supply Co.; W. H. Dudley, Frigidaire Corp.; S. W. Scott, Graybar Electric Co.; H. S. Stewart, L & H Ranges; R. M. Whalen, Geo. Belsey Co.; E. W. Isenhower, Westinghouse Electric Supply Co.; H. H. Fogwell, Thermador Electric and Mfg. Co.; E. V. Kane, Los Angeles Bureau of Power and Light; E. B. Barnes, Nash-Kelvinator Corp.; Fay Frey, Pasadena Light and Power Dept.; P. Diederich, Glendale Public Service Dept.; J. H. McCambridge, Burbank Public Service Dept.

Months of preparation prefaced the campaign. The idea originated last summer when the utility companies, uniting on a uniform range and water heater allowance, began considering the practicability of carrying the cooperative idea a step further in a uniform range sales campaign. Manufacturers and wholesalers signified their approval, and the present outstanding Popularity Sale was developed during the intervening months.

Utah Campaign

Range and water heater drive features cooking set

Set for early spring by wholesalers, the Utah Power and Light Co. and Electrical League of Utah is an electric range and water heater campaign that promises to be the most aggressive ever undertaken in the intermountain territory.

Beginning Mar. 3 and to run for a three-month period the program will include advertising in all media—radio, newspaper, billboards, direct mail, window cards, cooking schools, etc., amounting to thousands of dollars.

All promotion will be centered around the giving of a $22.50 set of nationally advertised aluminum as a trade-in for the old range.

A tie-in will be made with the great national advertising program on these two appliances being carried on currently by the electrical manufacturers and Modern Kitchen Bureau.

Employee Movie

PG and E enlists personnel as actors and salesmen

Effectively employing sound, motion and color a new motion picture, "Bill Jones, Employee" was the feature item on a roadshow program staged in all Pacific Gas and Electric divisions to acquaint employees with the company's 1941 sales program. The film has all division managers and many P G and E employees in the cast that supports the two professional actors, John Galbraith and Mrs. Mary Barnett.

The picture shows the many opportunities that all employees have to secure the names of prospects for utility services. Bill Jones imagines that he operates a one-man utility valued at $57,000, which is the P G and E investment per employee. The intervening scenes take the audience through power plants, offices, construction projects and to the homes of the company's consumers, pointing out in many ways the part an employee plays in the company's scheme of operation and also how he can help in building load and good-will.

To give the picture a local atmosphere, in each of the thirteen divisions in which it was to be shown, a sequence was made of that division manager in his office talking with Bill Jones. This section of the film was changed with each division showing.

In the 16 showings made before more than 8,000 employees the picture changes over to an actual playlet in which the two principal characters take

Pacific Gas and Electric technicolor movie traces experiences of "Bill Jones, Employee" and then changes over to the playlet pictured above using the same actors who emphasize the customer values of modern electrical appliances in the home

part. In the modern kitchen setting they trace the changes in appliances and their initial and operating costs. Clever use of fluorescent paint and ultraviolet light is made in this comparison. The story is tied into the plan of rewarding employees for the names of prospects who later purchase appliances or service.

The show opened with a gala event in Red Bluff on Jan. 24 and continued on its tour with a showing practically every week night until Feb. 15 in San Luis Obispo in the San Joaquin Power Division. O. R. Doerr, general sales manager, was in charge of the traveling show. The picture was made under the direction of Al C. Joy, manager of publicity and advertising.

Other Campaigns—

Swinging into the spring merchandising season will be many a campaign this month and next. The national campaign of the Modern Kitchen Bureau particularly will be started in many regions. Dealer selling is the very heart of all of these campaigns.

Pacific Gas and Electric Co.'s systemwide March and April electric range and water heater campaign is to be launched. Details are carried elsewhere.

Southern California—A joint campaign of dealers and utilities on electric ranges, during March and April. Participating will be Los Angeles Bureau of Power & Light, City of Pasadena, City of Glendale, City of Burbank, Southern California Edison Co. and distributors of ranges.

Nevada-California Electric Corp.—In March and April a refrigerator campaign. Imperial Valley's fair is scheduled in March and the Orange Show at San Bernardino.

Puget Sound Power & Light Co.—March, April and May a water heater campaign in cooperation with dealers. In April, May and June, water heater and range combination. Tie-in with the Modern Kitchen Bureau program "The Electric Water Heater Jubilee for 1941."

Pacific Power & Light Co.—In March a home laundry campaign featuring washers and ironers, also a commercial adapter fixture campaign for lighting.

Washington Water Power Co.—in March will stress ranges and water heaters. The campaign will run into April. Special dealer and company cooperative campaign is planned.

Bureau of Radio & Electrical Appliances of San Diego County—In March a refrigeration and laundry equipment promotion. For radio, when frequency changes are made on March 29 a campaign around these. Annual Spring Fair, April 22-27.

Spring Electrical Exposition, jointly sponsored by the Southern Colorado Power Co., Pueblo, and Rocky Mountain Electrical League, will be held late in March, E. C. Alexander, vice chairman of RMEL sales and promotion section is in charge. The League's black light demonstration and show equipment will be the crowd attracting sensation.

Southern Colorado Power Co., Pueblo, March and April, range and water heater promotion.

Bureau of Power & Light, Los Angeles, spring range campaign of all southern California utilities (see story).

Utah Power & Light Co. and Western Colorado Power Co. will participate in the all-industry range and water heater campaign during March and April. A running water campaign for farm districts and one on irons is scheduled for April in addition. Visit of the G-E Traveling Lighting Institute in March is to be the main special event.

And Shows—

Reports from the road indicate a number of new products showings to dealers during the past month.

• J. H. Carmine of Philco Corp., Philadelphia, held a number of meetings throughout the Pacific Northwest. In Salt Lake City the meetings were held under auspices of Strevell-Patterson Hardware Co., intermountain distributor and Appliance Wholesalers' Inc., Seattle distributors, H. E. Saviers & Son Inc., Nevada distributors. With Carmine were R. E. Blodget, factory service engineer, Cliff S. Bettinger, Pacific Division manager, and John B. Parsons, advertising manager.

• B. E. Rowley, district manager Hotpoint appliances, and R. W. Kimberlin, Graybar Electric, Salt Lake City, presented a Hotpoint show at Butte. John Jackson and A. M. Carlin, factory representatives, were with the show.

• In Washington, Westinghouse Electric Supply Co. with D. N. Salsbury manager, conducted shows in various trading centers. Eric Hall, merchandise sales manager, and George Miles, Jr., merchandise manager of the north Pacific district, Westinghouse Electric & Mfg. Co., were with the troup.

• Bendix held a series of showings of its new home laundry sales clinic throughout the West. In Salt Lake City under Flint Distributing Co. the show was held. H. L. Smith, district manager of Bendix, C. J. Laufersweiler, western sales manager, were there in person and a long distance message was deliverd by S. J. Sayer, vice president in charge of sales, from South Bend, by telephone.

• One hundred eighty G. E. dealers of the intermountain territory gathered at the Newhouse Hotel in Salt Lake City, January 21, to hear the company's sales plans and see the 1941 models of ranges, refrigerators, water heaters, vacuum cleaners and washing machines. The meeting was presided over by Jacob A. Kahn and Will O. Smith, district manager and sales manager, respectively, of the local General Electric Supply Corp.

And An Idea—

One of the handiest, simplest, most easily used sales tools on kitchen planning is being made available to dealers and utilities by the Modern Kitchen Bureau in its "The Principles of Modern Kitchen Planning." Completely neutral, a dealer in any make of appliances can use it.

The 24-page booklet is specially designed "as an aid to architects, builders and others concerned with kitchen planning." Printed in lithograph, it is plentifully illustrated with both floor plans and pictures. It presents in compact form the best ideas developed by all of the manufacturers of kitchen electric equipment, together with additional pages on lighting and an exceptionally good diagram on kitchen wiring.

Modernization of older kitchens and even apartment kitchens are given a place in it. Electrical dealers can use it with telling effect on prospects for kitchen equipment.

MKB Will Pull No Punches

More of everything will be provided by the Modern Kitchen Bureau in its range and water heater promotions during 1941. Not only will there be the full quota of direct mail, matt service, window cards and other advertising material, but this year will find some extra and powerful sales tools.

First of these is a full color talking motion picture presenting the modern kitchen idea in half an hour's entertainment, each appliance selling its own side of the story. Ready about March 15 in 16mm. color Kodachrome with sound synchronization and voice, the picture is designed especially to be applicable to any make of product. It fits in perfectly with a range or refrigerator campaign of any kind.

Second feature is the "He-men Cooks" promotion in which the special recipes of famous men cooks and the flare that many men have for fancy cooking is made the talking point of a range campaign.

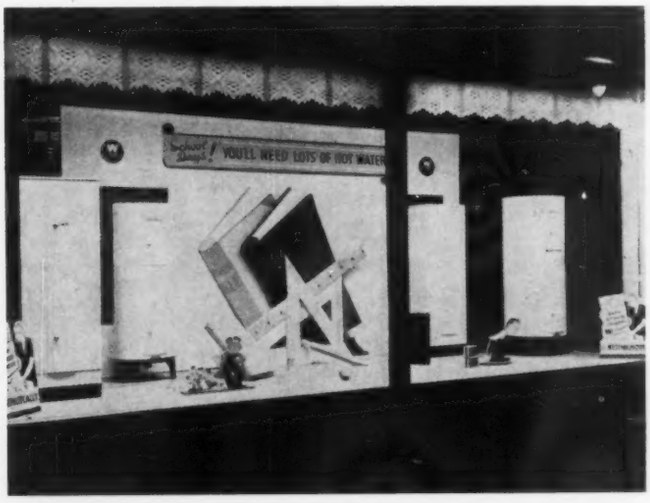
Next is considerably more national advertising than before in more national magazines. To tie in with this national women's magazine advertising will be mat service for dealers and utilities.

Another new wrinkle has been the preparation of 16 water heater radio programs, already recorded, with singing, dramatic skits and smooth selling copy, by leading professional talent. Each runs one minute.

Donald Duck will again be used for the water heater promotion with his pesky three nephews. There will be three contests during the year in water heating. First is an overall contest for utilities doing the best all-around job of promotion and sales. Second is a window display contest on the side. Prizes of $500 top the list on both contests. Another new national contest is open to utilities, department stores and dealers for a best floor demonstration of water heaters. It also offers a $500 prize.

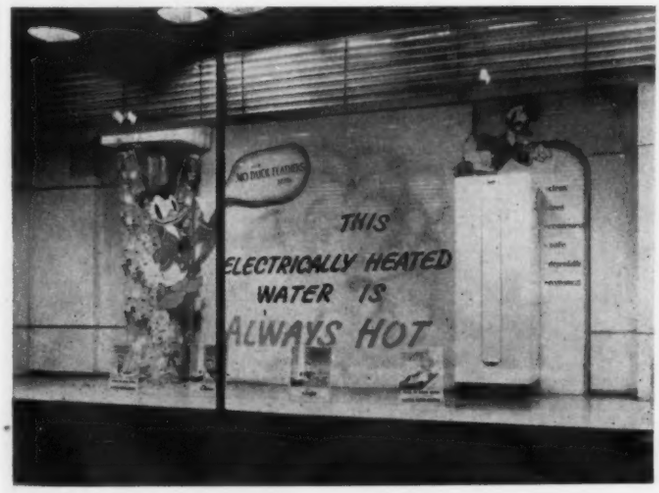
Still another selling tool will be eight 15-min. sound slide films covering every important phase of sales training for the retail salesman and dealer. Prepared by experts in the sales training field, these films will cover basic sales training and advanced selling information on the four major appliances—range, refrigerator, water heater and laundry equipment. Again, this training program can be used with any brand of appliance and is good for years.

Four Westerners won third prizes in the MKB water heater window display contest. W. J. Bray, Jennings Furniture Co., Portland, arranged the window pictured below left and C. F. Warmoll, Pub. Service Co. of Col., Denver, one below, right



Earl Skidmore, Idaho Power Co., Twin Falls, arranged this one

J. W. Bremmer, Northwestern Elec., Portland, did this window



"Full House" for Merchandise Mart

More dealers buy more merchandise at 51st annual market week than ever as speakers predict record sales opportunities. J. J. Nance of Easy and Carl Snyder of Gen. Elec. urge better all-around sales technique

"AS long as sales go ahead, business will go ahead. As long as business goes ahead, there will always be a free America!"—Jim Nance of Easy.

"Hell, we have the stuff that *keeps* the woman beautiful, young and attractive."—Carl Snyder, G-E Co.

"Even more gratifying than the 35.6% increase in attendance at this market, was the broad and substantial character of the buying. I firmly believe it will show a greater percentage of increase than the attendance."—Frank K. Runyan, Western Merchandise Mart.

In three succinct statements, the real character of the semi-annual western home furnishing market and the semi-annual trade dinner of the western radio and appliance industry can be gaged. The 9-story Western Merchandise Mart, San Francisco, never held so many genuine buyers who showed such a keen interest and eagerness to place orders as at the 51st market which came to a close Feb. 8.

From 11 western states, Canada, Alaska, and Hawaii came dealers and buyers to view the latest products of over 600 national and regional manufacturers of home furnishings and appliances. Exhibitors interviewed by ELECTRICAL WEST never displayed such unanimous enthusiasm for the market and the order-placing.

At the trade dinner Wednesday evening, Feb. 5, the main dining room was jammed to capacity with a crowd of over 850. J. J. Nance, vice president and general sales manager, Easy Washing Machine Corp., and Carl M. Snyder, assistant manager, appliance and merchandise department, General Electric Co., Bridgeport, Conn., were the two headlined speakers. Harry A. Strong, executive vice president of Servel, Inc., was chairman of the dinner and A. F. Rice, general manager, Occidental Stove Co., toastmaster.

A Seller's Market

"Primed by defense spending, national income is expected to reach a new all-time high," said Nance, "while home furnishings sales, for the first time in years, should top $3,000,000,000. Most important factor, *optimism* is returning.

"Just how long the good times can be expected to continue, however, is a matter on which opinion is divided. A great many business executives refuse to commit themselves for more than a year and a majority won't forecast beyond two years. On the other hand, other observers confidentially assert that the period of prosperity we are now entering is certain to last a number of years. By the time the defense program has run its course, they argue, America will be standing on the threshold of a new era of empire expansion. The responsibility of erasing from the world the devestation of war, through rebuilding, will spur our industries to new highs."

Defining the present market as a seller's market, he maintained that buying is a more exact function because buyers must now exercise all their judgment to avoid an under-stocked or over-stocked condition. A salesman's problem, likewise, is twofold, he declared. On one hand, the seller's market obviously offers him a golden opportunity with consumer demand exceeding anything he has known. But the promise of excellent sales it holds also confronts him with a dangerous temptation to take it easy.

After pointing out the extremely favorable conditions on the West Coast for selling, he continued, "But before we relax our selling efforts, I would like to point out two things about this business boom which I believe are vitally important. One involves the responsibility to our country. The second, a responsibility to ourselves.

"First, we must recognize that armament spending, except insofar as it

stimulates commerce and the consumption of useful goods, is largely wasteful. It has been said that war makes rattling *good history* but it doesn't make *lasting prosperity*. Therefore there must be a vast increase in the production and consumption of useable goods to help defray the cost of the armament program, to build a backlog against the day when the artificial stimulant of defense spending ends.

"Our huge defense program has but one purpose—to protect American democracy. Yet the very foundation of our democracy is the American system of free enterprise. It is *business* that keeps the wheels of democracy turning. It is *selling* that supplies the power. As long as sales go ahead, business will go ahead. As long as business goes ahead, there will be a free America."

From the individual dealer's standpoint, he went on to show that the first thing to do was to analyze his local market carefully. Then check the sales force, see whether they are equipped with the tools to implement their efforts. Analyze advertising programs, re-check the merchandising program. Consider the service staff, too. The opportunity, he said, to really study these was seldom as good as it will be now.

From the product angle, it is the time to get rid of sluggish items. It is also the time to increase the proportion of sales in the higher priced brackets. The accelerated rate of the replacement sales should be watched. Inventories should be examined carefully. In view of possibility of shortages, it may be wise to carry fewer lines. Increased emphasis on nationally advertised lines should prove sound merchandising. Advertising, instead of being less necessary, should be more necessary for there will be more competition for the consumers' dollars.

Re-sharpen the Tools

Since Mr. Nance had covered the broader aspects of the business picture, Carl Snyder ducked into some of the technical details. Particularly he emphasized the re-sharpening of sales tools, some of which had long been neglected but are still exceedingly effective.

The need for this, he said, could be found in a startling realization that the electrical appliance industry, although taking a larger volume of sales at lower prices, was receiving far less from the average family than 10 years ago. In 1929 $60 was the average annual take from the average family, whereas in 1939 it was only $34.47. Moreover, total volume of business does not assure the electrical industry of getting its share. It must compete vigorously with other industries which are after that same volume.

That the sales tools have lost their edge because sales people have wearied too soon of their own story was what he wittily and pointedly reminded the audience.

Advertising is one such tool. "We spend enough on it, Lord knows; what is wrong with it? Take a look at it. There is too much emphasis on *price*." Advertising should return to romancing. Style experts might better write washer ads. At least they do not sell the details of a dress from a clothes hanger in technical terms. The cosmetic industry bases its appeal on beauty. But what does it offer except a palliative or an attempted cure for tired lines and wrinkles. "Hell, we have the stuff that *keeps* the woman beautiful, young and attractive — labor-saving electrical appliances," he declared.

Ensemble selling, a second tool that has not been used as effectively as it should, should be sharpened up. In G-E's own experience, the investment dollar in the kitchen has doubled since that company has advertised the entire kitchen ensemble.

Display, too, needs refurbishing. It needs study to put new life into it. After all, a display is a dramatic stage and should have light and action. On lower prices and a consequent reduction in gross margin to the dealer, he said the industry must learn some way to sell in such brackets as will provide enough dollars to hire and train and pay good salesmen. Perhaps there have been too many price reductions resulting from engineering improvements passed on immediately to the public where some of the lowered costs should have gone into paying for better retailing.

Price maintenance at present levels, he declared, was so important that no one could view the problem of courtesy discounts and price chiselling with anything but apprehension.

An unusually significant remark was that the large chain organizations have made few basic contributions to progress. However, because of their exceedingly good organization and speed of action, better coordination and immediate response to orders from headquarters, they outspeed the independents. Independents must find a way to become faster in their "foot work," quicker to accept changes of trend and suggestions from the manufacturers and distributors. In that way they can cope with the highly organized chains.

Buying Trends

Whether anticipating shortages in stocks or priority delays, buying reached

a new record at this market. In appliances, the trend was noticeably towards the higher bracket wares. Refrigerator showings by manufacturers had preceded the market. The opportunity to close orders following such showings was given in many instances. In washing machines, interest was noticeable in the automatics even though samples of the new entries into this field were not yet available.

In radio, better cabinets and finer tone qualities showed a noticeable increase. Combination sets had their best year.

In lamps, many manufacturers are playing with fluorescent tubes. Nearly 60% of the floor lamps sold during market week were of the fluorescent type. Designs in these, however, are still something to be desired.

That rug makers are not anxious for fluorescent lighting to reach the home perhaps was best illustrated in the display room of a big rug manufacturer. Here a special lighting box was fitted with three compartments, the first lighted with a daylight fluorescent tube, the second incandescent lamp, the third with 3500° Kelvin white fluorescent tube. Identical samples of carpet were arranged in each. The box was used with dealers to illustrate the difference in appearance of color patterns under the different light.

This manufacturer contended that if carpets were designed for use under incandescent lighting in the home, fluorescent carpet displays in stores would so change their appearance as to become a potential cause for customer dissatisfaction.

Besides the advertised advantages of the Mart, there is one to the industry which was well exemplified at this market. What buyers are buying is a significant index of what these same buyers estimate their public will want and purchase from them in the succeeding months. Even in a seller's market, this relay of consumer reaction should not be overlooked by manufacturers and distributors.

Utah P & L

hands out a 1941 sales folder at dealer meetings

On presenting its dealer selling program for 1941, Utah Power & Light Co. and Western Colorado Power Co. conducted a series of meetings in its territory at the end of which a loose-leaf folder was given every dealer for permanent reference.

In the folder were loose leaf pages on the average cost per month for operating various appliances in that territory, the business aspects both nationally and locally, the farm market, the estimated sales forecast for that trading area in 1941, a page on adequate wiring and its needs, pages on the commercial and industrial market, description of the utility's sales promotion material of help to dealers and contractors, samples of ads to be run, suggestions for ways to increase sales, and a picture of the sales promotion men and women, the commercial and industrial staff, whose job it is to help dealers build business during the year.

WWP

gives every employee a booklet about electric use

That everyone in the Washington Water Power Co. may "know it, tell it, sell it," a special booklet has been issued to tell the 1941 electric service sales program to all employees and to enlist their participation and enthusiasm in it.

Throughout runs the theme "a great service from a good company" from the opening message of K. M. Robinson, president, through its various subdivisions — industrial sales, commercial sales, residential and farm markets, advertising and sales promotions for the year.

A trick method of binding the book makes ingenious use of humanized photographs illustrating various fields of use for electricity in the Inland Empire served by the company. An employees' prospect system is run in conjunction with it.

Wesco

finds its Western staff leads the nation in sales

Westerners from Wesco lead the nation in the annual sales contest of the Westinghouse Electric Supply Co., its sales bulletin reveals. William Powell, manager of merchandise sales for the northern California district, was on top for merchandise sales for the entire nation. Clyde Williams, also northern California, was second on apparatus and supply sales. Rudy Holtermann with the northern California district was third from the top of all the districts and the Tacoma branch was in second place for branch offices. The Seattle district was also in the prize money.

Among individual salesmen prize winners were Wally Tull, northern California, merchandising; Hills of north Pacific Division, and Rylander of southern California District. Second prize winners included Clark Baker, Jr. of northern California, Muehlenbruch of north Pacific and Cleveland of southern California. Third prize winners were John Taylor of northern California. Tally of north Pacific and Althoff of southern California.

● Hostess Club, new promotion for enlisting the aid of users, has been developed by the Hotpoint sales department. It includes an invitation on special letterhead and printed with the retailer's name to be sent to new range users. It offers a choice of four hostess gifts for sending the name of a friend who has shown an interest in her equipment. If the friend makes a purchase within 90 days, the gift selected will be sent. Choice of a three-piece copper-clad stainless steel utensil set, 44-piece china set, a full double bed blanket or a 2-volume dictionary are offered for such qualified prospects. Dealers are offered a kit of 100 such invitations at a nominal price.

● Bill Poster in Size was the gigantic ad of Meier & Frank Co. in *Portland Oregonian* announcing the new 1941 Frigidaires. To gain greater height for the pictures of refrigerator and range, the ad was run crosswise of the double page spread. The effect was dramatic.

● With Leonard Oppenheim, kitchen planning specialist of General Electric Company of San Francisco on hand to "help you plan your kitchen for greater convenience and beauty" the storage center and G-E refrigerator accessory cabinet were given a special play by Breuner's at Sacramento early last month. Now that kitchen storage centers are standard package merchandise, this promotion indicates a new means of developing this market.

● With a Standardized Range Wiring Policy throughout southern California, Southern California Edison Co. has announced its policy in regard to wiring where a customer moves. In a recent dealer bulletin, this policy provides that "the customer who has received a wiring allowance will be entitled to one additional wiring allowance only; the second or move allowance will be made only in event the range has been in use at the original location for a year or more; no allowance of any kind, either service entrance unit or cash, will be made in the event customer moves the range in less than one year or moves more than once."

● "Out of the Coffee Pot Into the Spitfire" is an eloquent headline used by B. C. Electric Railway Co. to announce a patriotic exchange deal. A special trade-in of old aluminum percolators, coffee pots, or aluminum cooking utensils was offered on a new Silex coffee maker. Aluminum is delivered to the Canadian Red Cross salvage department and ultimately finds its way into "active service."

Wholesalers

Hear about how national defense will affect business and also learn about 1941 markets at annual Del Monte meeting

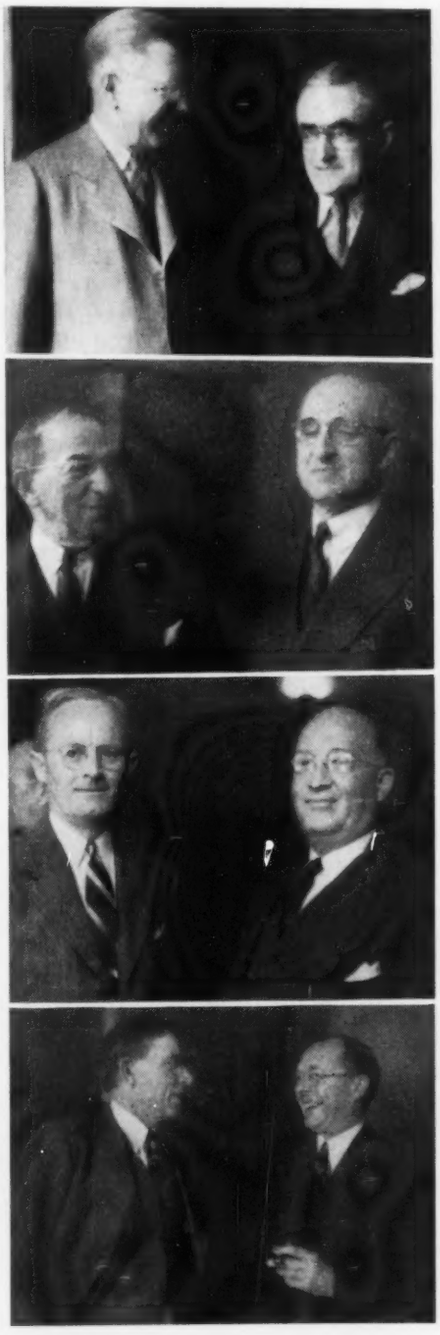
HOW the defense program is affecting electrical operations and markets on the Pacific Coast was outlined by representative speakers at the annual Pacific Division meeting of the National Electrical Wholesalers Association at Del Monte, Calif., February 13-15. That electrical business in this region will reach new record high levels and that priorities may affect future supplies of materials were two conclusions emphasized before the 250 wholesalers, manufacturers and utility men in attendance.

An urgent warning against competitive and uneconomical sales tactics that will squander valuable and irreplaceable stocks of materials was issued by N. J. McDonald, vice-president and general sales manager, Thomas & Betts. "Remember we all want to be in business long after the present emergency is over," he said. "We can't do it by raiding each other's customers and selling supplies at prices that will not permit stock replacements even if stocks can be obtained." McDonald urged that every effort be made to take care of the 20% of customers who usually provide 85% of the total business, especially as stocks become low. He cited probable instances where "butter will be sacrificed for armament" in electrical manufacturing.

Commander Frank M. Harris, USNR, chief of the bureau of tests and specifications, Pacific Gas and Electric Co., speaking for the Navy, told how defense was affecting Pacific Coast industrial development, especially in the shipbuilding and aircraft industries. Both will be large users of electrical equipment, he declared. Coast plants have $1¼ billions of ship contracts and $1.4 billions of aircraft orders. The electrical industry has an opportunity to capitalize upon the necessary plant modernization that will result from defense contracts, he said. Industrial plant decentralization to secure local labor supplies and control and management centralization to insure material supplies are trends that he predicted.

A plea for the continuation of advertising and merchandising along a wide front was made by J. M. Spangler, vice-president and general manager, National Carbon Co., who warned against the lure of defense attractions. He pointed out that the roots of the U.S. economy are deeply sunk in the production of consumer goods and urged that consumer research be intensified.

Problems and programs of the electric utilities as they affect the wholesaler and manufacturer occupied one whole session. J. A. Polhemus, president, Portland General Electric Co., explained how utilities in the Pacific Northwest were streamlining to meet the government competition from Bonneville and Grand Coulee federal power projects. While the low rates which have been forced on them are producing business for all branches of the industry, the utilities have been forced to fight to maintain their position. Utility men present were interested in his suggestion that if 6% is the limit of earnings to be allowed utilities by regulatory bodies, then there should be a stabilization fund provided to take care of lean years.



Gadsby — McArthur
Kahn — Colwell
Duggan — Jewell
Marsh — Holtermann

That electric service is adequate and efficient to meet any defense power demands was the declaration of George M. Gadsby, president and general manager, Utah Power & Light Co., Salt Lake City. He asserted that the U.S. faces the crisis of 1941 with an installed electrical capacity of 41 million kilowatts—more than that of Germany, France, Italy and the British Isles combined—and that four-fifths of this generating equipment has an average age of little more than ten years. The nation's integrated power supply embracing 83,000 miles of 60-kv. and over transmission lines and 300,000 circuit miles of 11-kv. lines, he said, could provide electric service wherever it was required by a defense industry. He concluded with the assertion that "if the government will encourage the use of private capital for the expansion of private enterprise, this nation will be spared the threat of socialism."

How utility sales and construction budgets will affect 1941 business was outlined by George C. Tenney, editor, ELECTRICAL WEST. With 1940 appliance sales in the Far Western states totaling $128,000,000 or $40.60 per residential customer, he said that commercial executives expected appliance sales increase this year ranging from 2.5% to 19%. Upwards of 140,000 new homes will be connected to utility lines this year. Wholesalers also will participate in the $78,000,000 utility construction program, he said. On top of this is a government power program in the region which will boost totals to more than $150,000,000 for construction. R. E. Fisher, vice-president, Pacific Gas and Electric Co., San Francisco, sponsored the utility contributions to the program.

In the annual golf tournament, the Copper Cup was played for in the one hundredth competition and was won by J. I. Colwell, Pacific Northwest manager, Graybar Electric Co. John Fox, National Carbon Co., Los Angeles, won the Manufacturer's trophy; George Boring, Portland manager, General Electric Supply Corp., took the Glendenin Cup and George Sullivan, vice-president and general manager, Portland Electric Power Co., captured the central station trophy.

RMEL

Sets up ambitious program of promotional and service activities for coming year

A 12-plank sales and promotion platform for 1941; convention will be held in Estes Park, Colo.; Lighting Institute, Denver, Mar. 13; parallel conferences of engineering and accounting divisions, Denver, Mar. 14 and 15; organization of additional local leagues; expansion of statistical activities of the League; advertising service for member companies.

The foregoing constitute the highlights of the discussions and decisions during the mid-winter conference of the Rocky Mountain Electrical League and executive committee in Denver, recently. In addition to the topics already listed, the 12-point sales and promotion program that was adopted also will embrace adequate wiring, kitchen modernization, better light-better sight, commercial fluorescent lighting, street and highway lighting, rural electrification, personnel development, employee-customer relations, table appliances, electrical expositions, Christmas lighting. The 12-point program was unanimously adopted following its outline by President G. B. Buck, who has just taken over League leadership for the current year.

Activities Will Be Expended

The League's combined traffic meter and portable lighting laboratory, it is planned, will be used by several of the major companies during the year, to fit into their street and highway lighting promotional programs.

Plans also were discussed for a material expansion of the adequate wiring program. Under the guidance of T. M. Foulk, newly-appointed chairman of the adequate wiring bureau, demonstrations and meetings of this unit of the League will be held in several places. Arrangements are being considered for joint meetings of electrical contractors, architects and builders, one of the first of such meetings being scheduled for Albuquerque.

Fluorescent lighting, it was agreed, should continue to receive the attention of the League, particularly those problems which have not yet been solved to the satisfaction of the public and those having to do with the installation of this sort of lighting. The better light-better sight program too, will continue to be a live activity, with plans already under discussion for territory-wide promotional endeavor.

Christmas lighting will be the curtain-raiser for the end-of-the-year shopping season, as was so profitably done in several localities in the territory during the past year. Even greater effort should be made to encourage electrical expositions at the beginning of the Christmas shopping season.

Engineering—Accounting—Lighting Institute

Several of those present expressed the opinion that the League henceforth should become more closely concerned with the load-building activities of the various rural electrification projects. Greater attention to employee and customer relations also was suggested by several of the conferees, as was personnel development. The Lighting Institute which the League will sponsor in March, will be something entirely new. It will be under the direction of J. M. Ketch of the General Electric Co., with a traveling show that will include some of the very latest applications of lighting. It is planned to have the lighting institute on the day and evening preceding the Engineering and Accounting section meetings, to permit delegates to these conferences and their company associates interested in lighting to come to Denver at one time.

A number of additional local Chapters of the League are in prospect. Two or more of those, it is expected, will very shortly be organized in Public Service Co. of Colo. territory.

December, 1940, it was reported by League Manager George E. Lewis, terminated one of the most active years of the organization. During December the League sponsored a series of electrical expositions, Christmas lighting festivals and other pre-Christmas sales activities that transcended all previous programs. The various expositions, sparked the opening of the Christmas shopping period. In several instances, dealers and distributors were unable to meet the demands for appliances for gift purposes.

The newspaper and other publicity received by the industry was far ahead of any previous year. Entire sections of newspapers were given over to the promotion of electrical appliances. A dozen radio stations added their influence to the League's program. In addition, billboards, for which copy was provided by League headquarters, were more widely used than ever before. Supplementing these media were posters, banners, window cards and other promotional material supplied, without cost, through League offices.

In connection with the Christmas lighting festival in Denver, Guy W. Faller, president, Public Service Co., presented to the city an immense American flag, which was floodlighted on 60-foot poles and, by means of an ingenious mechanical arrangement, kept outstretched and in motion at all times. The flag was the mecca for more than 300,000 light-seeing citizens during the Christmas season. Civil and military authorities, including Governor Ralph L. Carr, Mayor Benjamin F. Stapleton, Denver, Commander Early E. W. Duncan of Lowry Air Field, commanders of American Legion, Veterans of Foreign Wars, and naval marine posts participated in the dedication of the flag.

More than 15,000 residents in Denver lighted up for Christmas, according to a survey made by the League. Practically every town and city in Colorado and scores of towns in New Mexico and Wyoming conducted Christmas lighting programs.

Inland Empire Assn.

Reports on successful program to serve as guide for 1941

SIX divisional units of the Inland Empire Electrical Equipment Assn. functioned actively throughout the year 1940. Practically every divisional unit held monthly meetings which, after all, seems to be the basic reason for their successful operation. Many cooperative promotions were conducted successfully, according to R. B. McElroy, its secretary.

The adequate wiring promotion was exceptional in that electrical contractors tied-in with 20,000 lines of newspaper advertising. In addition, the association carried 6,000 lines of advertising. This total of advertising resulted in 22,000 lines of editorial support by the newspapers, all of which was devoted to the value of adequate wiring. Adding these amounts, 48,000 lines of newspaper space, or 20 full newspaper pages were devoted to this important subject.

A promotion was conducted, in Spokane only, by the local fuel dealers, featuring automatic stokers, oil burners and furnace fans. Newspaper advertising for this event started Sept. 20 and closed Nov. 20—60 days at the tag end of the selling season. Notwithstanding the off-season, with a quota of 500 stokers, 100 oil burners and 100 furnace fans, a grand total of 807 combined units were sold. The average selling price was about $150 each, which indicated a dollar volume well over the $100,000 mark for the dealers. Total advertising used in the newspapers during this 60-day period amounted to 2,423 column inches of dealer copy and 1,025 column inches by the association or in other words, 20½ full pages of advertising for this event.

A block long strip of electrical advertising and publicity intrigued utility division members at RMEL'S mid-winter meeting in Denver. Present were (seated left to right) G. B. Buck, president; M. H. Soule, L. R. Storey, vice-pres., J. W. Alexander, E. T. Tengdin and Harry Adler. Standing (left to right) Arthur Prager, vice-pres.; K. W. Kissick, E. A. Bradner, C. C. Webster, W. D. Johnston, vice-pres.; W. N. Clark, W C. Sterne, C. S. Sterne, O. B. Summers and J. E. Loiseau

Several cooperative electric range campaigns were conducted over the name of the association, the most interesting of which was that during the months of June, July and August. With a quota of 2,000 electric ranges, sales amounted to 2,044, of which the dealers sold 1,546 or 75.7 per cent of the total. The campaign resulted in an equivalent of 86 full pages of newspaper space. Range sales volume amounted to $276,000 of which the dealers received $211,940.

An interesting fact here is that the cost of dealer advertising in proportion to their dollar volume of sales amounted to only 2.3%, an extremely low percentage.

"It is evident that cooperation pays—cooperative activities pay big dividends to dealer and utility alike," declared McElroy in promising a similar year of activity during 1941.

IAEI Committees

In a letter to the membership O. W. Newcomb, president, Southwestern Section, International Assn. of Electrical Inspectors, announced committee appointments for the year. At the same time, he called attention of inspectors to some of the grave problems in inspection facing them with the defense program, great increases in construction at certain areas, lack of additional manpower and the need also for alertness to detect disloyal or subversive activities.

Chairmen of the general committees appointed by Pres. Newcomb are as follows: Articles of association, H. G. Ufer; California State Safety Orders, G. E. Kimball; civil service, O. K. Jones; clearing house, R. H. Manahan; code coordinating, F. A. Short; investigation of electrical fires and accidents, H. V. Dobson; legislative, R. H. Manahan; membership, N. J. Siggins; ordinance, C. E. Heise; Pacific Coast Building Conference, joint committee, Victor W. Hartley; publicity and public relations, W. A. Cyr. Committee appointments were also made for the article committees of the National Electrical Code.

● Idaho State Electrical Contractor's Assn. was formed at a meeting of 34 contractors at the Lewis-Clark Hotel at Lewiston, Idaho, not long ago. W. H. Hopper of Boise was elected president, J. Carl Baldridge, Boise, secretary-treasurer, and sectional vice presidents and secretaries, respectively, elected were: for North Idaho, Les Stewart of Moscow, Gordon Defoe, Lewiston; southwest Idaho, Carl M. Waite, Twin Falls and A. S. Gilbert, Twin Falls; southeast Idaho, F. V. Hall, Pocatello, and Elmer E. Smith, Buhl.

Contractors Banquet

Sacramento Electrical Contractors' Assn. held its annual dinner Jan. 31 as an all-industry banquet. Retiring president of the association, C. P. Stewart Donely, was chairman of the committee in charge, assisted by Rex Moore, and Jack Kohl. Among the guests were members of the State Contractors' License Bureau, city electrical department, state engineers, Pacific Coast Electrical Assn., Pacific Gas and Electric Co. and local wholesale concerns. E. L. French, newly elected president, was introduced by Donely. Others making brief welcoming addresses were Allen Miller, state registrar of contractors, and Ed Florence, division manager PG and E.

Other officers of the organization elected in addition to French were Frank Merwin, secretary, Jack W. Thomas, vice president, C. C. Buford, treasurer, and association manager W. H. Welsh.

SW Inspectors

Fluorescent lighting details occupied much of the discussion at the Jan. 22 meeting of the Southern California Chapter IAEI at San Bernardino, Earl E. Malmgreen of Alhambra, chairman of the chapter, presiding.

Two aspects of the fluorescent problem came up. First, A. C. Veit, chief electrical inspector, Los Angeles County, warned inspectors to require 2 watts per sq. ft. of wiring in occupancies in which fluorescent wiring was used at the time of inspecting so that if fluorescent lighting is changed to incandescent because of a change of occupancy or for any other reason, sufficient capacity will be installed. At the afternoon session, B. A. Selten, vice president, Lighting Fixture Industry of southern California, reviewing the history of lighting fixture manufacturers'

problems with fluorescent, recommended that fixtures be inspected to ascertain that they are made in accordance with recognized standards. The particular problem of hanging weight with the new larger tubes was a factor to be taken into consideration. Frank Hansen, Western Institute of Light & Vision, also discussed fluorescent lighting from the industry viewpoint.

F. V. Frey, Municipal Lighting Department, of Pasadena, stressed uniformity among utilities for service requirements, especially in underground construction.

● EVEN A WAGE INCREASE meeting did not draw as large a crowd from local No. 6, IBEW, of San Francisco as when Clark Baker, lighting counsellor for the Northern California Electrical Bureau started his second by-request series of lighting classes for electrical workers. Starting with two meetings on fluorescent lighting, to be followed by three on other lighting, the Feb. 19 meeting drew 260 attendance. Other meetings are at one month intervals.

SF Contractors

Elect Abbett president and hear about cost survey

Only a minor change was made in the administration of the San Francisco Electrical Contractors' Assn. at its annual election. George W. Abbett was elected president, to succeed Carl Severin who resigned because work at distant projects made him unable to carry on. Abbett was vice president last year. William Weindorff was elected vice president and Edward Martin was retained as secretary and George D. F. Smith as treasurer. Most of the directors were re-elected also. They include Edward W. Scott of Edward J. Lynch Co., C. C. Severin, C. L. Chamblin of California Electric Construction Co., James Surtees of Twin Peaks Electric Co., G. Walter Spencer, Thomas Harris of H. S. Tittle Co., and B. J. Doherty.

An overhead cost survey has been completed for the association by the firm of Ross L. Perkins, certified public accountants. This survey revealed that the average operating overhead cost of San Francisco contractors was 35.98% on total job cost. The survey was for the purpose of determining a minimum overhead by which to assist the district attorney's office in the enforcement of the California Unfair Practices Act which prohibits selling below cost. A minimum of 20% on prime cost will be set up as the lowest overhead. Any bid which indicates that less than this minimum has been applied for overhead cost will be subject to investigation by the

Vice-President Weindorff and President Abbett head San Francisco Contractors

district attorney's office. The operation of this act has been successful in the grocery business under a similar program.

Utah League

Committees to guide its activities during 1941 were selected at a board of trustees meeting of the Electrical League of Utah on Jan. 15. Kimball Vance will head the activity committee with O. Reid Bigelow, Roy W. Kimberlin, Raymond Ackerman, J. F. McAllister and W. J. Berryman assisting. Membership committee consists of Will O. Smith, chairman, Allan M. Baker, Verd W. Edwards and Fred Schoss. Because of his great success in directing the work of the adequate wiring bureau since the League's reorganization, Lester B. Johnson was unanimously selected to again head the League's adequate wiring committee. Other members of this committee: Ralph Colborn, vice-chairman; W. R. Hancock, E. E. Oberg, Blaine Grey, M. J. Kynaston, C. A. Wolfrom, J. Hyde Stayner and Frank E. Young, Jr.

Chairman of the program committee is J. Vernon Sharp with J. E. Gillespie and Dan Hutchinson assisting.

● A NEW ASSOCIATION of electrical contractors and dealers of San Mateo County, Calif., has been organized. William F. Klose of San Carlos, Calif., was elected president and Joe Dingman of Redwood City, secretary. Meetings were held in February to discuss the new apprentice indenture system and to negotiate for a new wage scale.

Agenda

Southern California Chapter IAEI will hold its next meeting at Alhambra, Calif., Mar. 26.

Puget Sound Chapter IAEI elected A. J. Newton, chief electrical inspector, State of Washington, Bureau of Labor and Industry, as chairman at its last meeting; E. E. Lee, chief electrical inspector, Seattle, vice chairman; and Jack Dixon, service superintendent, Puget Sound Power & Light Co., Olympia, was renamed secretary-treasurer.

IAEI of the Rocky Mountain region will hold a 2-day meeting Mar. 27-28 in Denver.

National Association of Practical Refrigeration Engineers, Pacific Coast Division and Northwest Association of Ice Industries, and Washington Refrigerated Locker Association, Inc., will hold a joint meeting in Seattle, Mar. 17. Representatives from Washington, Idaho, Oregon, California and British Columbia are expected.

American Society of Heating and Ventilating Engineers, San Francisco, Feb. 11. W. E. Oppenstein, engineer, United Air Lines, spoke on "Heating and Air Conditioning of Transcontinental Airplane Cabins".

California Retail Hardware Assn.'s annual convention, Western Merchandise Mart, San Francisco, Feb. 18-20. Joint dinner and entertainment on Feb. 19 with San Francisco Pot & Kettle Club as hosts.

Electric Club of Washington, Feb. 3 meeting, T. C. Cieslak, northwest representative, G-E Co. home bureau, subject "Home Electrification." Feb. 10, E. R. Hoffman, superintendent, City Light, new technicolor film on the Skagit development entitled "A Million Horsepower Skagit".

Electrical Estimators of Los Angeles, Jan. 30, speaker Wm. Harris, production manager for the Federal Housing Administration, subject "Electrical Equipment and Specifications for Federal Housing." Feb. 13, Joe Mullenbach, Mullenbach Electric Co., motion picture "Around the World in Three Hops".

Electric Club of Los Angeles, Feb. 24, speaker George C. Tenney, editor ELECTRICAL WEST, subject "The Power Industry of the West and National Defense." (Mr. Tenney delivered the same talk to the San Francisco Electric Club Feb. 17 and to the Iron and Steel Institute at Del Monte Feb. 7).

Oakland Electric Club, Feb. 24, John Marr, city planning engineer, subject, "Traffic Engineering in the City of Oakland." Talk involves street lighting and signal systems.

IES, Southern California Section, Feb. 4, speaker, Charles D. Gibson, superintendent Mountain View district schools, subject "School Lighting". Mar. 4, speaker, W. A. Cyr, associate editor, ELECTRICAL WEST, "Blackout Experiences in Wartime England".

IES, San Francisco Bay Cities Section, March meeting, "Symposium on Color" with several experts testifying.

IES, Washington State Chapter, "Fluorescent Lighting Institute" at University of Washington, Physics Hall, Feb. 3, 10, 17.

Electrical League of Utah—Feb. 18—Meeting of dealer division. Discussion of "Blue Book Trade-Ins" led by Elias J. Strong. W. C. Hollingworth, chairman, presided. Feb. 19—Monthly League meeting at which Dr. Irvin S. Noall, supervisor of industrial arts and occupation training for Salt Lake City board of education. Subject: "Vocational training in this Emergency."

Utah Chapter, IAEI—Feb. 4—Met jointly with electrical contractors at General Electric Supply Corp. auditorium to hear G. A. Howarth, assistant construction quartermaster at the Ogden ordnance depot speak on, "Electricity as it applies to national defense." Feb. 18—F. E. Weidner, Capitol Electric Co., discussed "Grounding." M. E. Dansie, Vance Electric Service spoke on "Overcurrent protection."

PCEA *Panorama* — *Edited by Mary Shoop*

WHO AM I?

I was born in Bayshore, Long Island, N. Y., Sept. 15, 1886. I attended Pratt Institute in Brooklyn, receiving my engineering degree in 1906. I have spent my entire business career with Westinghouse Electric & Mfg. Co. I joined the company in East Pittsburgh immediately after my graduation from college and have remained for the past 35 years. Who am I?

In 1910 I became a sales assistant in the San Francisco Westinghouse office, and I have resided on the Pacific Coast ever since. I am now manager of the central station and transportation divisions for the Pacific Coast district, comprising all of seven western states and parts of four others. Who am I?

I have been active in PCEA affairs for many years. I am also a member of AIEE, San Francisco Electric Club, Olympic Club, Commercial Club, Orinda Country Club, Commonwealth Club of California, and am a past master of the Rockridge Lodge No. 468, F&AM. Who am I?

My hobbies are gardening, photography and golf. I am married and live in the Piedmont section of Oakland. I have a married daughter and a son with the El Paso office of Westinghouse. My name, probably one of the most difficult to spell in the entire PCEA membership, is: See page 87.

The Convention

Theme chosen, meeting to open in afternoon

A new time schedule will govern the PCEA convention to be held in May at the Hotel Del Coronado, according to Joseph A. Long, general chairman. The convention will open Wednesday afternoon, May 21, instead of in the morning of the first day, as has been the custom. The change is made for the convenience of those traveling south to attend the meeting, Mr. Long said.

Sessions developed around the theme, "The Electrical Industry's Contributions to Progress," will continue Thursday and Friday, May 22 and 23, ending with the traditional dinner dance Friday night. The annual golf tournament, usually held on Friday afternoon, will be held this year on Saturday morning.

Plans being developed by committee chairmen indicate that this will be one of the most valuable and enjoyable conventions in a long line of outstanding PCEA events. An attendance of around 500 is expected.

Financing OK

A certificate of approval from the National Electrical Manufacturers Assn. committee on league financing has been received by PCEA for 1941, as it has for past years. This recognition is bestowed annually by NEMA on electrical leagues whose operation meets with approval and whose support by NEMA members is considered warranted.

Judges at Work

Eyebrow-deep in manuscripts, the three judges in the PCEA adequate wiring essay contest are progressing toward a decision which will be announced next month. Prizes, of which there will be a minimum of five, consist of attendance at the annual convention in May at the Hotel Del Coronado with all expenses paid.

Members of the PCEA industry information committee at their meeting Feb. 21, in Los Angeles began arrangements for the annual district meetings to be held next fall. S. W. Scarfe, G-E, Los Angeles, committee chairman, presided.

Following in general last year's schedule, the district meetings will be held early in October in 15 towns. Each will be a "little convention," bringing latest developments in the industry to persons who ordinarily do not attend conventions or conclaves. The program, identical at each meeting, will present talks on subjects of current industry interest, a dramatic lighting demonstration, and a panel discussion at which four experts will answer questions previously submitted by those in attendance.

Directors Honor Smith

Designation of the recent PCEA essay contest as the Richard E. Smith Memorial Award was made by the board of directors at their first 1941 meeting on Feb. 20, in Los Angeles. The gesture is in recognition of the interest which the late Mr. Smith, a PCEA director, took in developing the contest.

W. C. Mullendore, executive vice-president of the Southern Cal. Edison, was appointed to fill the post on the board left empty by Mr. Smith's death. Another new director is Milton Saunders of Central Arizona L & P, Phoenix. He succeeds A. F. Morairty, of the same company, who is on leave of absence.

New chairman of the code and ordinance committee, appointed by the directors, is J. O. Dillingham, G-E, San Francisco. He succeeds C. E. Heise, Westinghouse, San Francisco, who has retired.

A closer union of activities between the northern and southern groups at the annual conclaves was urged in a resolution submitted by the Operating Economics Section. It urged that the groups meet jointly.

ELECTRIQUIZ

Mark these true or false; then turn to page 887 for the answers.

1. The eighth wedding anniversary is the Electrical Appliance Anniversary.
2. No. 8 solid copper wire is smaller physically than No. 8 iron wire, provided the latter is not galvanized.
3. The sale of electricity in California per customer per year is less than 3,000 kw.-hr.
4. Pure silver is a better conductor of electricity than pure copper.
5. Good speakers on electrical subjects for industry gatherings are hard to secure.
6. Only employees of utility companies are eligible for PCEA membership.
7. I have read pages 53 to 56 inclusive in the January issue of ELECTRICAL WEST.
8. Electric ranges are wired to use 120 volts.
9. Seven hundred and forty-six watts is equal to an ohm.
10. If you wind a number of turns of insulated wire around a piece of soft iron you would have a static detector.

Graham Holabird, National Electric Products Corp., Los Angeles, and J. R. Gabbert, Nevada-Calif. Electric Corp., Riverside, supplied the material for this month's Electriquiz.

ELECTRICAL WEST

McGRAW-HILL COMPANY OF CALIFORNIA
68 POST ST. SAN FRANCISCO

The all-industry magazine of progress, established 1887 and incorporating the "Electrical Journal," "Journal of Electricity, Power & Gas" and "Journal of Electricity." Contents Copyrighted

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No Blitzkreig Wanted

BLOOD pressures in southern California are mounting toward the bursting point as the competitive sales tactics of the gas range people apparently tend toward a point where reprisals are certain. The concern of electric range people started when the gas utilities staged competitive demonstrations of gas and electric ranges before their own people for the obvious purpose of demonstrating the superiority of the fuel-type equipment if this were possible. The concern became intensified when home economics teachers of high schools and colleges were invited to witness these one-sided demonstrations. Today the blow-off point is approaching as gas range manufacturers sponsor similar demonstrations for dealers and their sales people.

In these latter shows performance comparisons are made between oil, electric, butane and conventional gas ranges. Since the meetings are sponsored, the winner of the tests can be determined almost in advance (although dealer friends have reported that there have been occasions when the electric range outperformed all others to the embarrassment of the demonstrator).

It would be highly unfortunate if these tactics were to be continued to a point where reprisals were attempted. Thus far there has only been talk, but no prophet is needed to predict that action will follow. As one electric range man said, "It's no trick to demonstrate a gas range so that the oven door will blow off."

How different is the situation in London where competitive tactics have been replaced by cooperation. A recent issue of the *Electrical Review* reports as follows:

"The widespread breakdown of gas facilities has, for instance, put a high premium on electric cookers (both standard and breakfast), hot plates and kettles, with the result that hotels, restaurants, public houses etc., have been clamouring for apparatus to help them meet the needs of their customers. In this connection it is interesting to hear of the helpful cooperaton between the electricity and gas undertakings. In one district where the gasworks was put out of action, the gas company actually assisted in getting the electric cookers installed. The 'truce' is in fact now a reality in deed as well as in word, the *blitzkreig* having done more to bring this about than all the pious wishes and good intentions."

It is to be hoped that no *blitzkreig* will be needed to assure cooperation in the Southland.

Emergency Conversion

IF THERE is any one in the electrical industry who has his tongue in his cheek about the seriousness of the national defense emergency, he had better change his mind in a hurry. N. J. McDonald, vice-president of Thomas & Betts, told those attending the Del Monte wholesalers' meeting just how it would affect the industry. Taking just the question of conversion of plant he said:

"Is the electric toy manufacturer to be free to make playthings when his machinery is needed to make gunsights and binnacles for battleships? Do you realize that the manufacturer of electric sewing machines or adding machines can make automatic pistols; that automatic lead pencils come out of the same kind of a machine that will make ammunition; that manufacturers of cash registers and business machines could just as easily make bomb fuses? If the production of electric refrigerators was curtailed, the manufacture of airplane parts could be increased. Vacuum cleaners come off the same assembly line as gas masks. Machines making thin-wall conduit could make tubing for airplanes."

He did not say these things would happen; he did emphasize that they could happen.

Power for National Defense

IN DEVELOPING the research for the remarkable story "Power for National Defense," engineers of Electric Bond & Share Company have provided operating affiliates and the whole power industry with a spectacular theme for capturing public imagination. In tracing the evolution of the $14,000,000,000 private power industry during the last 50-odd years, the story sets up a clear conception of the ability of the electric utilities to meet the defense emergency. It forcibly impresses upon those who read the story in pamphlet form or hear it from the platform the reasons for the evolution of the integrated inter-connected utility system as against an isolated enterprise.

The story is particularly pertinent in the Far West where large integrated systems have been developed to high efficiency, where sentiment for government ownership through PUD's and municipalities threatens and where the Federal government is fostering a campaign to socialize the industry. "What a break it would be for dictators," says one Northwesterner in telling the story, "if this wonderfully integrated network that makes possible the delivery of power throughout the Pacific Northwest in the quantity needed at a moment's notice, were to be broken up and disintegrated. And further, how obliging of this great American democracy to effect disintegration with its own taxpayers' money." This point is easy for the layman to grasp with the aid of the maps and charts that go with the story, showing in how much better position the industry is today to serve national defense than it was in 1918.

Although the story is national in scope, it is susceptible of infinite local applications, and so is adaptable for use by district managers and other local power company people, who, taking a first glance at the charts and maps, think, "that scarcely applies to us." For instance, what would be the position of Pendleton, Ore., today, when asked to serve 1,000 kw. to an Army airbase, if its power service had been developed by an isolated PUD, instead of by a progressive private company backed by a strongly-financed holding group? Chances are the Army would have had to supply its own generating equipment, using taxpayers money sorely needed for tanks, guns and ammunition. As it is, Pendleton's surplus power capacity is backed by several hundred thousand kilowatts on the Missouri River in Montana, the Spokane and Chelan Rivers in eastern Washington, the White Salmon and Lewis Rivers in western Washington, and, a few months later when the new tie-line between Utah Power & Light Co. and the Montana Power Co. is completed, one could add to that imposing list the Snake River in Idaho and Bear River in Utah. This statement seems to paint an imaginative picture, but it is none-the-less perfectly possible, by the displacement method of power transfer, to supply a large load in emergency from these remote plants in Pendleton or any other town in the area through one or more of the six large integrated Bond and Share systems serving that region, to say nothing of other interconnected systems outside the Ebasco group.

Truly the story can be told anywhere in the United States, with impressive local adaptations that should dispel much of the fallacy of PUD and municipal ownership. Further, there appears no reason why other companies not in the Bond and Share group could not develop their own story, perhaps using some of the basic material of the Bond and Share research, which is all-inclusive as far as the national situation is concerned.

It may be pertinent to point out also that with this story goes the collateral story of the benefits of holding company financing and development. The power grid in the United States, as it exists today, could not have been possible without, first, a community of interest among operating affiliates of large holding company groups that furnished the initial incentive for interconnection, and secondly, without tremendous accumulations of credit possible only under our well-established American system of holding company financing. Many possible lay hearers of this story know all about the iniquities of holding companes; few can conjure into their minds any benefits. But here is one benefit that has led directly to a substantial and adequate preparedness for defense emergency on the part of the private power industry.

ONCE upon a time a great prophet addressed a herd of Donkeys: "What would a Donkey require for a three-day journey?" "Six bundles of hay and three bags of dates," they replied. "That soundeth like a fair price. But I have for only one of you a three-day journey, and I cannot give six bundles of hay and three bags of dates. Who will go for less?" Behold, all stood forth. One would go for six bundles of hay and two bags of dates, another for three bundles and one bag. One especially long-eared Donkey agreed to go for one bundle of hay. Spake the prophet: "Thou art a disgrace to the herd and an ass. Thou canst not live for three days on one bundle of hay, much less undertake the journey and profit thereby." "True," replied the Ass, hanging his long ears in shame. "But I wanted to get the order."—Anonymous.

Outdoor Electric Brooding

By W. E. LYON
Lyon Rural Electric Co.
San Diego

POULTRYMEN have experimented for years with outdoor brooding because they have recognized the advantages of fresh air for the growing birds and also have seen possibilities of low housing costs. However it is only in recent years that developments of commercial importance have been made. This has been due to two factors: (1) lack of understanding of the air requirements of birds: and (2) dependence upon oil heaters as a source of heat. Also, in many cases, the hover was heated through the floor, thus subjecting the birds to underheat, a method not to be recommended in any system of brooding.

Initially outdoor brooders were designed with the idea of conserving all the available heat for bird comfort and economy of operation. In these cases proper ventilation was entirely overlooked. However, it has been demonstrated today that with properly designed electric equipment it is possible to coordinate such factors as ample hover ventilation and correct heat distribution and regulation so as to build entirely practical commercial brooders. Such brooders are now operating under a wide scale of climatic conditions for outdoor raising of quail, pheasants, chickens and turkeys. Cases are on record where baby chicks were started and successfully brooded in temperatures of 7 deg. below zero.

Demonstrated advantages of outdoor brooding include (1) fresh air supply to growing birds; (2) low housing costs; (3) better sanitation than with house brooding; (4) birds protected from rodents; (5) convenience and cleanliness in handling flock; (6) equipment portable—easily moved to any location; (7) no litter expense; (8) better feathering; and (9) healthier birds.

Operating costs of outdoor brooders are no higher than in any cold-room type of installation. Costs, as in the case of any electric brooder, are governed by the thoroughness of the hover insulation, the design of the heating unit and the ceiling height of the hover. With properly designed brooders operating on average rates, electric heating will compare favorably with any fuel heating method. Field data for 200 meat-type birds brooded four weeks with a mortality of 1.9% showed a consumption of 80 kw.-hr. at a cost of $1.60 or 0.8 cent per bird. Another run of four weeks for 725 meat-type birds showed a mortality of 1.4% and a consumption of 0.27 kw.-hr. per bird. Weight averaged 50% greater than shown in feeding bulletins for birds of comparable age. In another installation 53 turkeys were brooded for five weeks with no mortality and a consumption of 30 kw.-hr.

Because of the adaptability of electric heating units to outdoor brooders, it is practical to build types that are particularly convenient for both the large and the small producer. The single runway type is used for capacities of 100 to 150 birds. It is constructed with the runway of any desired length and the hover located in one end. Hover heating is accomplished with either a reflector type unit mounted on the ceiling or with a heating unit mounted in an air duct at the rear of the hover. The latter arrangement insures better ventilation. The single runway outdoor brooder considerably broadens the market for electric brooding because birds may be raised in a great variety of locations. In suburban areas many a housewife or boy can supply the household with fryers for a considerable length of time with such a unit.

The double runway type with hover equipped with a fan heating unit permits installations for handling from 700 to 1,000 birds. The hover is located between the two runways with the brooding space divided by a partition.

For successful operation, several construction points must be observed. Outdoor runways should be covered with roofing so that birds are protected from rain at all times. In cold windy climates side curtains should be provided for use when necessary. Wire floors are usually built 1 ft. above ground. The space between floor and ground should be boxed to prevent wind movement under the floor. The floor level should be protected by boxing all sides 1 ft. above the floor. The hover should be insulated and weather-proofed. A small observation window should be placed in the side of the hover because observation of bird comfort is essential in order to regulate brooder heat properly.

Flexibility is another advantage of the outdoor brooder. When properly designed, the outdoor hover may be disconnected from the runway and used in any desired location. The producer who puts his birds on ranges can use a hover in connection with a regular range shelter that is equipped with a wire floor. This outfit may be started at a convenient point where power is available and as soon as the birds can get along without heat, the hover may be disconnected and the runway moved to the range.

Low investment as well as the other advantages outlined should make outdoor brooding particularly appealing to the chicken and pountry raiser.

Sixty-five outdoor-type electric brooders produce 1,000 fryers a week at Mountain High Ranch on Southern California Edison lines. They have proved their economy

* Based on a paper before the Thirteenth Annual Rural Electric Conference, U. C. College of Agriculture, Division of Agricultural Engineering, Davis, Calif., Jan. 13-15, 1941.

Adequate Wiring Demonstrator

RMEL Wiring Bureau devises dramatic portable unit

"IF we only had something to make the effect of inadequate wiring demonstrably clear and dramatic!" This has long been the plea of every one in the industry who has been charged with taking the story of inadequate wiring to the public. And it has been met with a variety of demonstrating equipment. Latest and one of the most effective wiring demonstrations is that perfected by the Adequate Wiring Bureau of the Rocky Mountain Electrical League. It has been used successfully in adequately wired demonstration homes and in electrical shows and expositions. Also replicas of the board have been used by various utility companies in the territory served by the league.

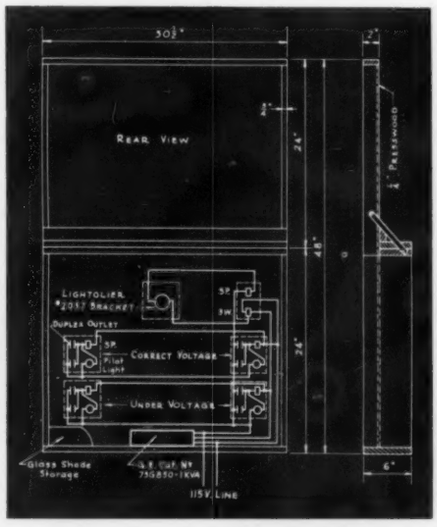
The demonstration unit incorporates two circuits, one operating at normal voltage and the second at 10% undervoltage. Substandard voltage is provided by a small auto-transformer. Two double convenience outlets that include a pilot light and switch are connected to each circuit. In addition a 40-watt lamp housed in a Lightolier fixture is connected to both circuits by means of a 3-way switch. The board has the added feature of portability. As shown in the drawing, it may be dismantled and folded into a compact unit.

In the demonstration the light is switched from normal to substandard voltage and although the difference in output is barely visible to the eye, a sight meter shows a reduction in light output of 30%. Most dramatic demonstration uses two single-slice automatic toasters. One is attached to each circuit. The two are timed identically, that is, to produce two pieces of toast browned to exactly the same degree. The toaster operating at normal voltage performs properly. The one attached to the under voltage circuit operates longer, and when it does shut off, the piece of bread shows no browning at all. Actual tests show that double the operating time is required to give the same degree of toasting effect.

Switches used on the board are of the silent type, since they provide a good talking point. The pilot lights are for effect only. In making the demonstration, care is used in the language employed; technical terms are avoided. It has been found that this successful visual exhibition of the effect of overloaded wiring coupled with a convincing story on the advantages of adequate wiring has succeeded in popularizing the wiring story.

The unit was designed by T. M. Foulk of the appliance service department,

Portable demonstration unit that visually tells the story of over-loaded wiring



Public Service Co. of Colorado, and Ralph E. Johnston, Sturgeon Electric Co., Denver, league Adequate Wiring Bureau chairman.

● SIX SUCCESSFUL lighting equipment sales campaigns held by utilities in various parts of the United States are described in a 90-page manual compiled by the home lighting equipment sales committee of Edison Electric Institute. This manual is composed of extracts from the various companies' plan books and reveals how they analyze their home lighting markets, determine the approach, tell of dealer and employee cooperative plans, terms, bonuses, etc. One purpose is to stimulate interest and participation in the $1,000 prize award contest of the Edison Electric Institute, 420 Lexington Ave., New York City.

Idaho Institute

A Sight Institute conducted jointly by the State Division of Public Health, Idaho State Medical Assn. and Idaho Power Co. was held recently at the Twin Falls Idaho Power Co. auditorium. It was attended by county teachers' associations and others interested in eyesight conservation. Dr. E. L. Berry, state director of public health, opened the session with a message upon the need for eyesight conservation, saying that out of state funds $110,000 is spent each year to aid the blind in Idaho.

Superintendent Homer H. Davis of Twin Falls school system discussed "The Seeing Task." Dr. O. A. Fuller, optometrist, spoke of light and lenses. Also heard on the program was Uldine Gartin, blind resident of Caldwell, Idaho. who spoke of the training of the seeing eye dogs. School lighting was discussed by Harold Lackey, Idaho Power lighting specialist.

IES Conference

Some changes are being made in the program for the Illuminating Engineering Society's Pacific Division second annual lighting conference to be held at the P G and E auditoruim, San Francisco, Apr. 5 and 6, according to W. P. Bear, general chairman. Timothy Pfleuger, architect, has been so busy with new work being drawn up that doubt was expressed as to his ability to prepare a paper for the meeting.

Infra-red heating and baking will be made the subject of a special school immediately preceding the IES conference. In cooperation with the Fostoria Pressed Steel Co., an institute and power school will be held Apr. 21-24, also in the P G and E auditorium, at which power sales engineers from the eleven western states will be invited for a series of lectures and demonstrations.

● FLUORESCENT as well as incandescent lighting installations will be eligible this year for the 1940-41 Augustus B. Curtis Award, according to Darwin Curtis, president of Curtis Lighting Co., Inc. Liberalized terms and conditions have been made to fit with the trend of the times. Curtis Award presentations were due at the Edison Electric Institute before Mar. 1.

Spacing and arrangement of fixtures is obvious from the photo at the right without necessity of diagram

LIGHT for DRAFTING

Incandescent

The Need

The glare free illumination of drafting rooms to an intensity satisfactory for accurate and easy seeing.

Conditions

A drafting room 36 x 64 ft. with a 10-ft. ceiling of white plaster. The walls and steel venetian blinds are light in color.

Installed

Thirty-two Silvray lighting fixtures, No. 1500, with standard stem hangars were installed on 8 x 9-ft. centers. Each fixture is equipped with 500-watt bowl-silvered lamp. Pull chain switches were provided for maximum flexibility.

Results

Average intensity after three months of service is 45 ft. candles on the drafting tables.

Who

New office building for the Fluor Corporation, Ltd., at 2500 South Atlantic Blvd., Los Angeles. George W. Meyer had charge of construction. J. F. Walkup was the electrical engineer.

LIGHT for PROTECTION

Incandescent

Who

Plant of Federated Metals Division, American Smelting & Refining Co., San Francisco. Court Kinnison, project engineer; Westinghouse Electric & Mfg. Co., lighting equipment; Kuchel & Sievers Electric Works, electrical contractors.

Night view taken from bag tower, indicated in diagram at right

The Need

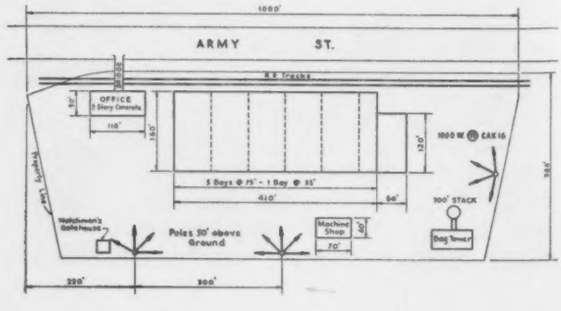
Semi-protective lighting for outdoor yards of such quantity and quality and placement as to provide ease of seeing to watchmen or for handling of materials in the yards at night.

Conditions

Several buildings as shown in the diagram in a yard of approximately 7 acres, fenced with protective fencing. Buildings of corrugated iron painted aluminum.

Installed

On three poles, 50 ft. above ground level, two groups of four, one of five Westinghouse CAK-16 floodlights with 1,000-watt lamps, are directed upon the south and east sections of grounds and building exteriors. Extending the length of the railroad tracks on the north edge are 150-watt RLM reflectors, 30 ft. apart. In addition to individual control, the floodlights may be controlled as a group from several watchman's stations.



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IT PAYS

to PROTECT

IMPORTANT SWITCHING LOCATIONS

by INSTALLING

KEARNEY TRIP-SAVER *re-closing* SWITCHES

Equipped with 3 Cartridges which have practical Left-to-Right Cycle of Operation

PLACE THEM WHERE YOU CHOOSE—at substations, on branch circuits at important customer locations—Kearney Trip-Savers give triple protection and practical left-to-right cycle of operation.

Left-to-right cycle of operation is important. Thus, *any* cartridge that has operated to restore an outage, can immediately be re-fused and placed in the reserve position, without in any way interrupting service or disturbing either of the other two cartridges.

Here is just one design feature which has caused so many operating men to specify Kearney Trip-Saver (re-closing) Switches where the advantages of three-shot protection are needed for increased continuity of service.

There are records of results, too, which are considered ample recommendation for this switch — many operating men reporting from seventeen to twenty-seven outages cleared over a period of years that Kearney Trip-Savers have been in service.

Of course, there are other features incorporated into the design of these switches to assure fine operating performance. There's the consideration of ample air gap; the regular time delay of standard switches, which is designed to clear up to 90% of the faults which may be encountered during the day or night; special time delay cartridges, if desired; plus other features described on the opposite page.

Why not look into the mechanical and electrical advantages of this re-closing switch? Why not see exactly how it works? An actual demonstration of the operating advantages of the Kearney Trip-Saver Switch can easily be arranged. The Kearney Representative in your territory has a sample of the latest Trip-Saver—ready to show and demonstrate to you—without obligation, of course.

Let us know when you would like to have him call during his next trip in your direction. Just drop us a note today.

JAMES R. KEARNEY CORPORATION

4236 CLAYTON AVE., ST. LOUIS, MO. • *Canadian Plant,* TORONTO, CANADA

Use KEARNE

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IP-SAVER WITCHES

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us know when you would like to have him during his next trip in your direction. Just us a note today.

CORPORATION

nadian Plant, **TORONTO, CANADA**

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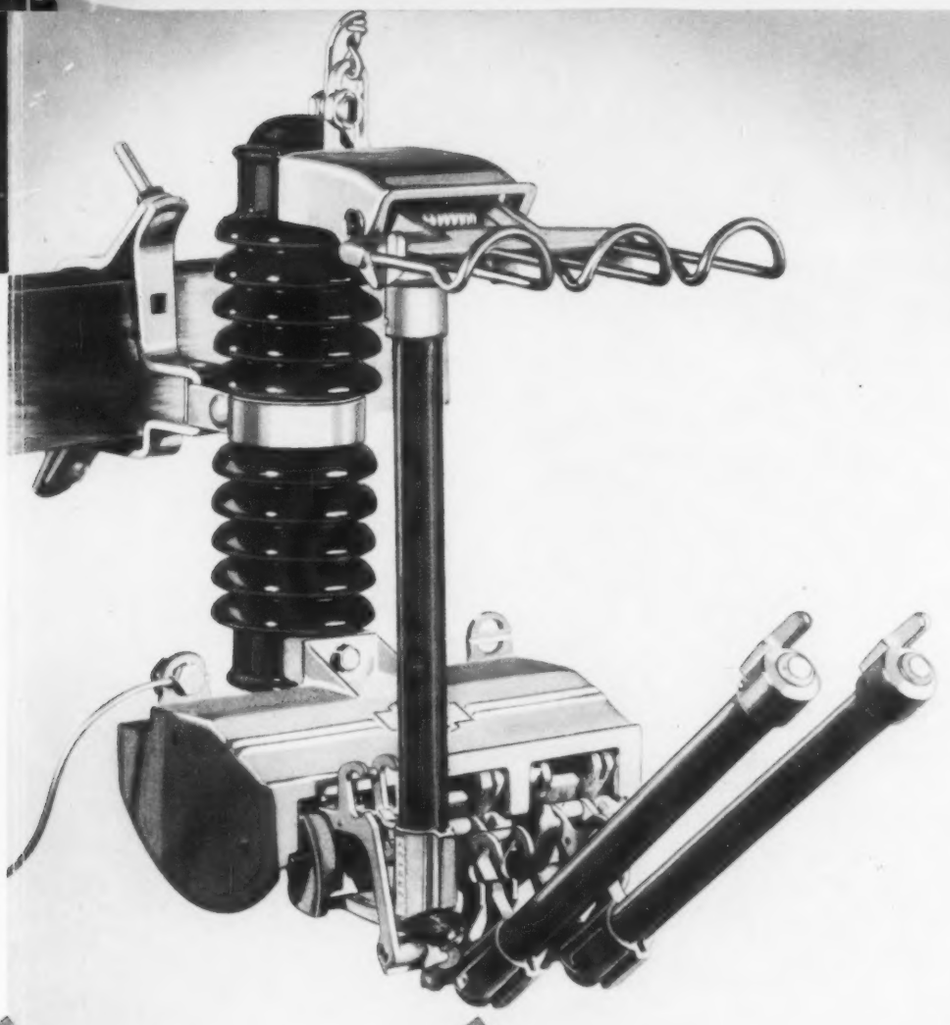
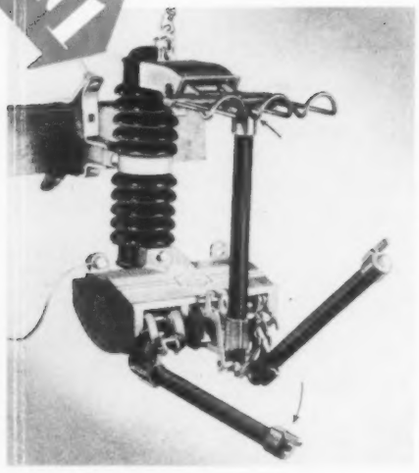


features of the KEARNEY TRIP-SAVER SWITCH

1. **AMPLE AIR GAP** — between live contact and reserve cartridges to prevent multiple operation of switch under lightning surges.
2. **POPPET VALVE ACTION** — of the fuse button head, held by resilient upper point pressure contacts, speedily releases gas pressures when fuse blows.
3. **KEARNITE CARTRIDGE TUBES** — the same high grade cartridge tubes as used in thousands of Kearney Trip Outs for years.
4. **ONE-PIECE TUBULAR INSULATOR** — sturdy insulators made of extruded wet process porcelain meet all mechanical and electrical requirements. (Also available with N. E. M. A. insulator mountings.)
5. **TRIP-FREE RE-CLOSING MECHANISM** — designed for complete cycle operation. Each cartridge mechanism must be reset before the cartridge can be removed—thus assuring safety. When the re-fused cartridge is placed back in the carriage, it is ready for service.

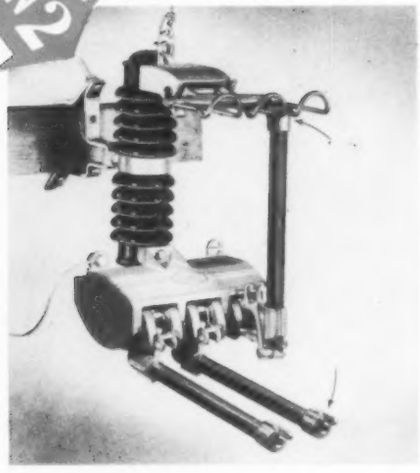
Ratings—
100 Amp., 5 Kv.–69 Kv. and
200 Amp., 7.5 Kv.–15 Kv., on N. E. M. A. Insulators only.

ACTION 1



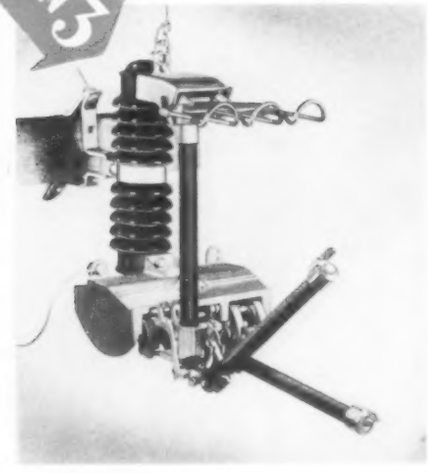
ACTION 1 — Left-hand cartridge has cleared a fault, as indicated by its lowest position. Middle cartridge has restored service. Right-hand cartridge is still in reserve position.

ACTION 2



ACTION 2 — Middle cartridge has cleared a fault and has dropped to trouble-indicating position alongside of left-hand cartridge. Indicates that trouble man should re-fuse.

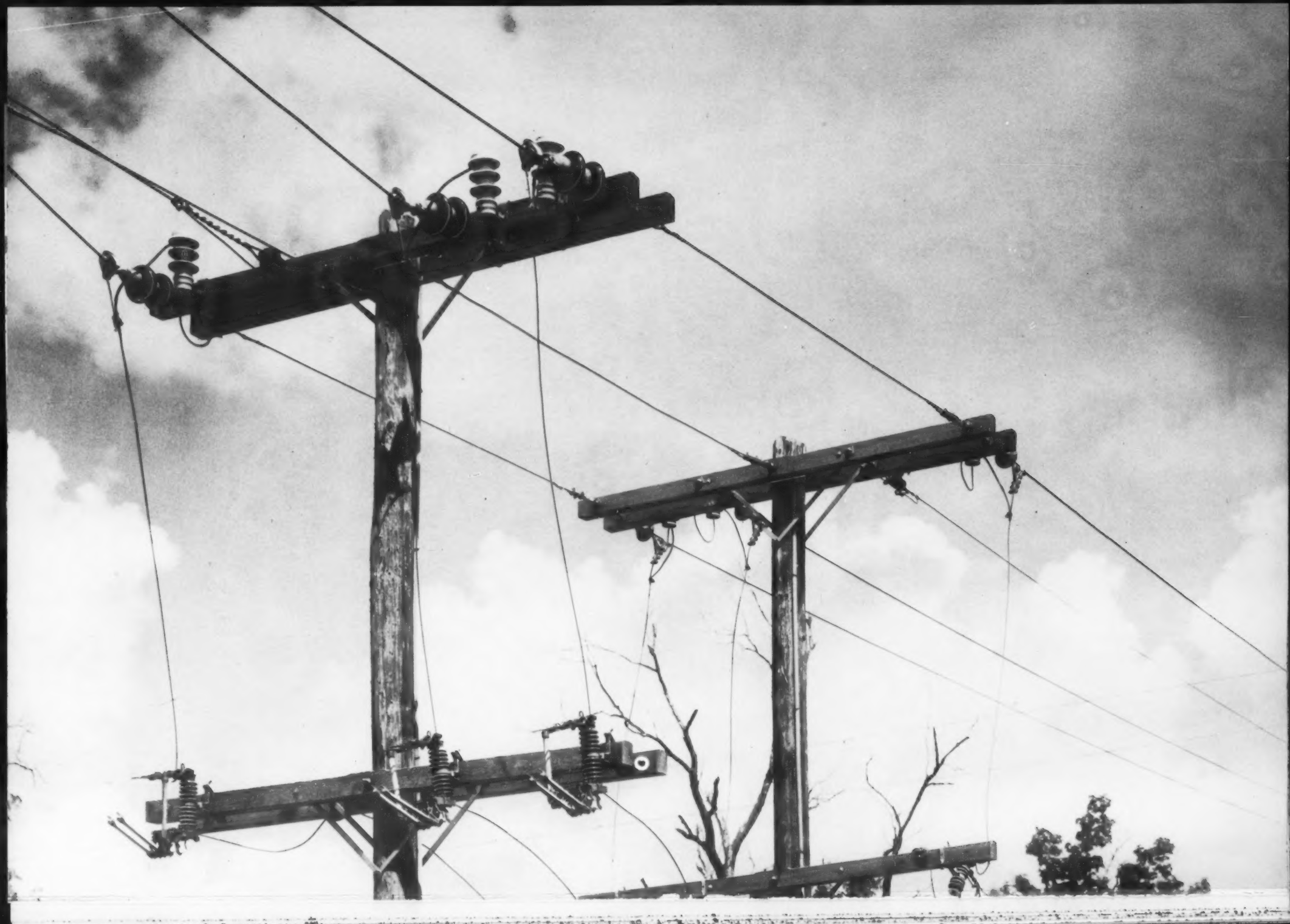
ACTION 3

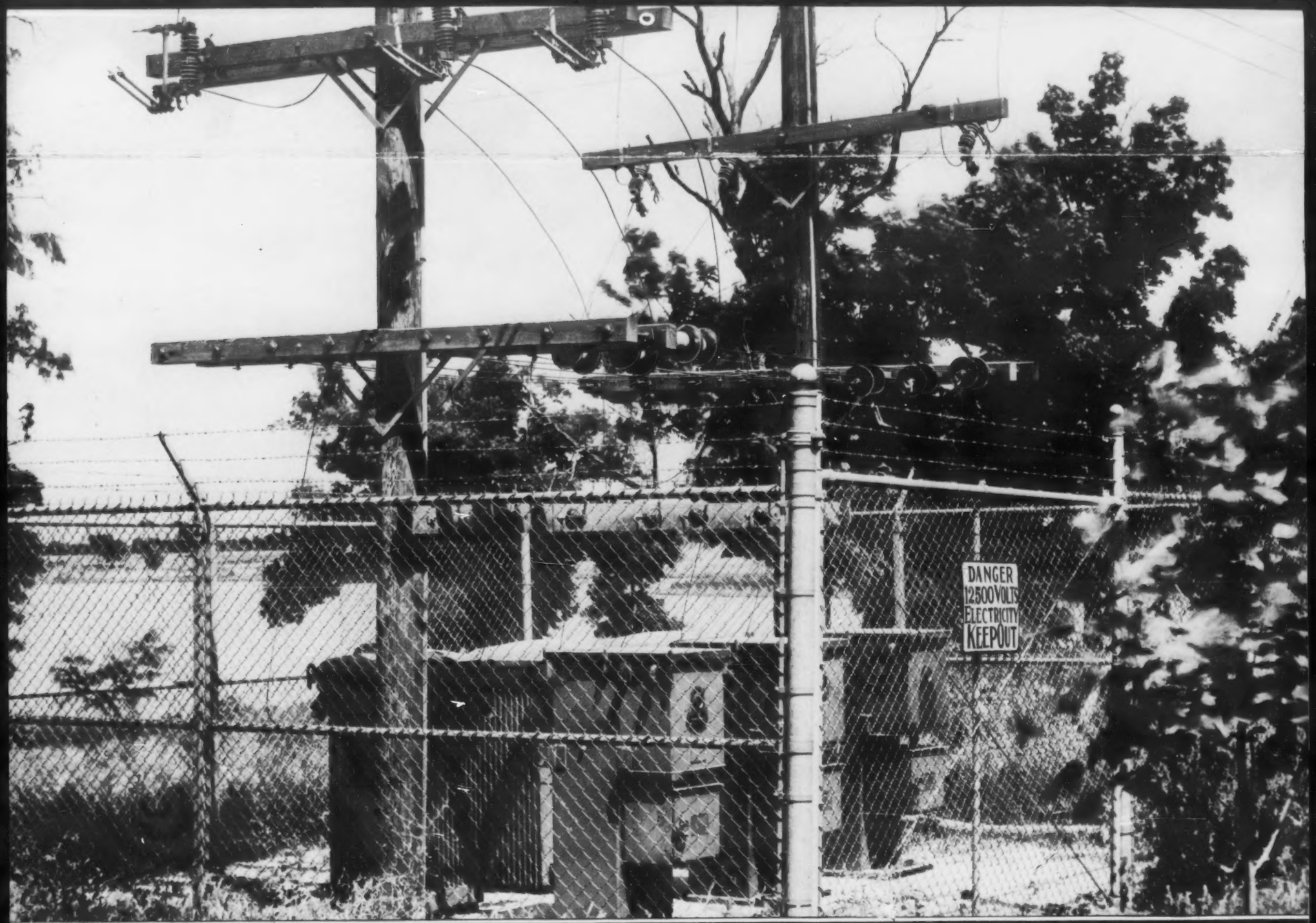


ACTION 3 — The trouble man has been on the job and re-fused. Left-hand cartridge was ready to resume cycle of operation after right-hand one operated. Middle cartridge is in secondary reserve position.

EY PRODUCTS

For Better Maintenance and Construction—





SECURING MAXIMUM SERVICE at a 12.5 Kv., Regulator Station—
***Using* 3 Kearney TRIP-SAVER *(RECLOSING)* Fuse Switches** DESCRIBED WITHIN THESE PAGES . . .

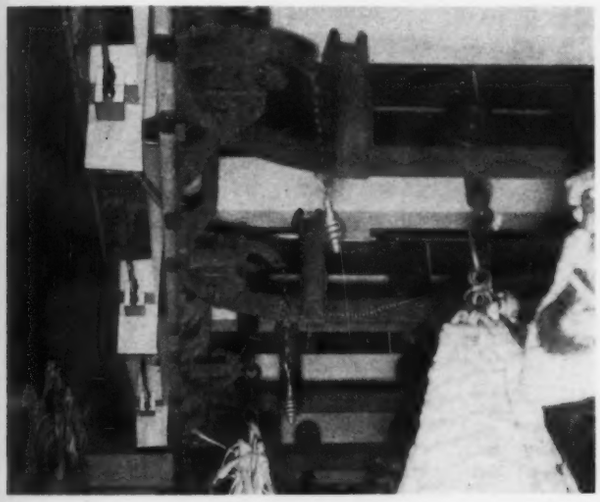
Using a Kentucky Knife

Copyright © 2015 by Jeffrey S. Buss

Tenderized

Sterilamps, fluorescent lighting, frozen storage make a super-electrified market in Napa a success

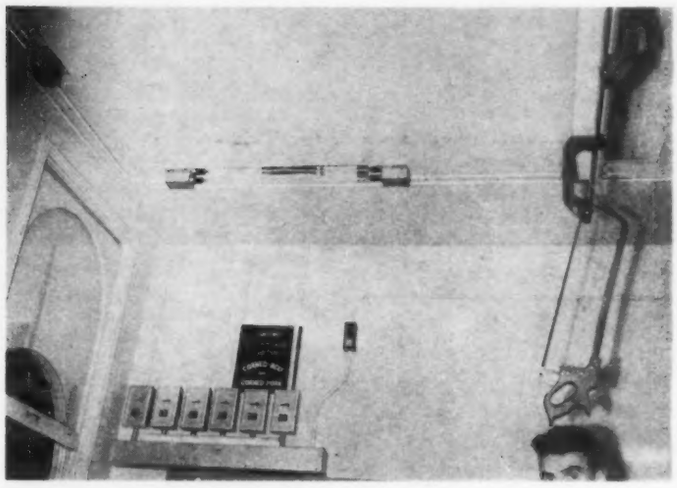
Maintaining stoutly from experience and months of experiment that tenderizing of meats really works by sterilizing the air and permitting meats to hang at high humidity (90%) and at 6° higher than normal storage temperature to allow the lactic acid to act, J. W. Dickie, engineer-manager of Lierman's market at Napa, Calif., has installed it extensively in the new 7,300 sq. ft. store. He plans to equip the company's slaughter house with ultra-violet tenderizing process



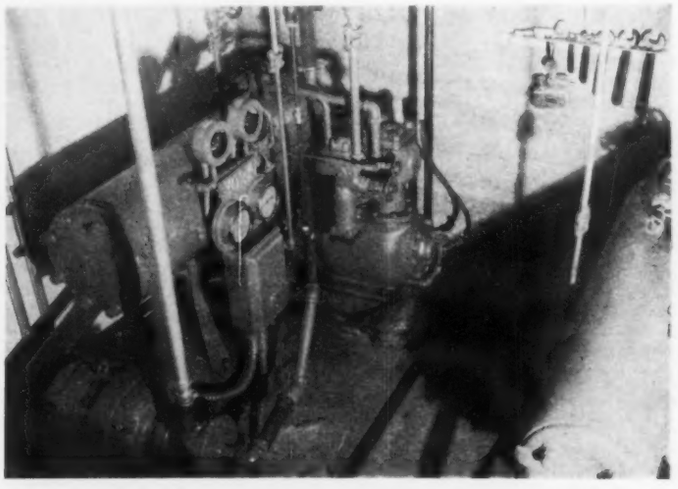
Above is a view in the back-of-meat-counter meat cooler room, held at 42° F. Sterilamps are seen at the left. They sterilize the air, prevent mold and mildew, keep odors absent, and permit the meat to tenderize without spoilage. High humidity stops shrinkage. Operating continuously, it only pays when the volume of business is high, says Dickie

Frozen storage lockers, 310 of them, next to a quick freezing room, permit farmer customers to buy or bring in a slaughtered cow or sheep, have it cut, frozen and stored until they want it. Game, too, can be kept. Farmers rent the lockers as they would a safety deposit vault, have access at all times. It saves them money, keeps them in fresh meat at all seasons

Main store area, with meat market and grocery store, is lighted by 12 specially designed vertical fluorescent lamps in stainless steel units, each with four 48-in., 40-watt warm white lamps. Windows have a total of 16 48-in. lamps in banks of two. Extensive use is made of zeon tubing inside and on the big exterior sign. The 46 ft. of meat counter at left is equipped with sterilamps in each section, and is held at 36 to 40° F.



Processing room to which the meat is brought by customers to be processed under sterilamps for 10 minutes, cut up into steaks, roasts, etc., packaged and then sent to the quick freeze room and lockers. An electric saw and scale is additional electrical equipment. Sterilamps are arranged in a rectangle along the ceiling as shown above. Below are 13½ hp. of York Ice Machines with extra capacity for additional refrigerated storage. Earl G. Wilson, Napa, electrical contractor, made the installation



EMEA *Dope Sheet* — *Edited by Howard C. Park*
EMEA of So. Calif

No. 3 of a series

The revised National Electrical Code —to be known as the 1940 Code—was approved by the National Fire Protection Assn., May 6, 1940. It has been submitted to the American Standards Association and endorsed as an American Standard.

Some of the interesting changes and requirements of the code limit voltage drop, restrict use of types of insulation for conductors to certain ambient temperatures, change the current carrying capacities of conductors, permit the use of Thin-Wall insulation for *rewiring* existing installations, permit the increase of the number and percent conduit-fill in rewiring existing installations, etc.

Voltage Drop

"The size of the feeder conductors should be such that voltage drop, up to the final distribution point for the load as computed by Section 2203, will not be more than 3% for power loads, and not more than 1% for lighting loads or combined lighting and power loads."

Kind of Installation Governs Type of Insulated Conductor Used

New Wiring Installations—Types R., RW, RP, RH and RHT only may be used in new wiring installations.

Rewiring Existing Raceways—Types RHT, RPT, RU and SN may be used to provide additional current carrying capacity in rewiring existing raceways.

Approximate O. D. and Sq. In. Areas Over Insulation

Wire size AWG.	Types R, RW, RP & RH: Approx. O. D. inches	Types R, RW, RP & RH: Approx. area sq. in.	Types RHT & RPT: Approx. O. D. inches	Types RHT & RPT: Approx. area sq. in.	Types SN & RU: Approx. O. D. inches	Types SN & RU: Approx. area sq. in.
14	.190	.031	.162	.0206	.130	.0133
12	.210	.038	.179	.0252	.147	.0170
10	.230	.045	.200*	.0314	.168	.0220
8	.280	.071	.261*	.0535	.227	.0405
6	.380	.130	....	.....	.314	.0775
4	.450	.160	....	.....	.363	.1035
2	.510	.210	....	.....	.423	.1405
1	.570	.270	....	.....	.496	.1935
1/0	.630	.310	....	.....	.537	.226
2/0	.670	.350	....	.....	.583	.267
3/0	.730	.410	....	.....	.634	.316
4/0	.780	.480	....	.....	.692	.376

*Type RPT not approved larger than #10.
Type RHT not approved larger than #8.

Ambient Operating Temperatures Determine Insulation Grade Used

50C. 122F.—*"Code" grade*, types R and RW may be used only when operating temperatures are below 50C. 122F.

60C. 140F.—*"Performance" grade*, types RP, RPT, RU and SN may be used only when operating temperatures are below 60C. 140F.

75C. 167F.—*"Heat resistant" grade*, types RH and RHT may be used only when operating temperatures are below 75C. 167F.

Allowable Current Carrying Capacities

The permissible current carrying capacities are governed by the operating temperatures. In sizes No. 6 and larger, the current carrying capacities of "Code" grade wire are greatly reduced.

Insulated Wires Are Classified As to Wall-Thickness

Standard-Wall—Types R, RW, RP and EH.

Thin-Wall—Types RHT, RPT, SN and RU.

New Conductor Types, Insulation and Uses

Trade Name	Type Letter	Operating Temperatures	Insulation	Insulation Thickness	Outer Covering	Use
Code grade	R	50C. 122F.	Code grade rubber	14–10 3/64 8–2 4/64 1–4/0 5/64 250–500 6/64 501–1000 7/64 over 1000 8/64	Moisture-resistant, flame-retardant, fibrous covering	New, general
Moisture-resistant	RW	50C. 122F.	Moisture-resistant	Same as type R	Same as type R	Gen. or* wet loc.
Performance	RP	60C. 140F.	Perform. rubber	Same as type R	Same as type R	New, general
Small dia. bldg. wire perform.	RPT	60C. 140F.	Perform. rubber	14–10 2/64	Same as type R	Rewiring† existing raceways
Type RU (Latex)	RU	60C. 140F.	90% unmilled grainless rubber	14–10 18 mill	Same as type R	Rewiring† existing raceways
Solid synthetic	SN	60C. 140F.	Flame-retarding, moisture-resistant synthetic compound	14–10 2/64 8 3/64 6–2 4/64 1–4/0 5/64	None	Rewiring† existing raceways
Heat-resistant	RH	75C. 167F.	Heat-resistant	Same as type R	Same as type R	New, general
Small dia. heat-resistant	RHT	75C. 167F.	Heat-resistant	14–10 2/64 8 3/64	Same as type R	General#

*See Section 3055, 1940 Nat. Elect. Code. †See Section 3005-E, 1940 Nat. Elect. Code. #See Section 3005-D, 1940 Nat. Elect. Code. Types RPT and RU not recognized larger than #10 wire. Type RHT not recognized larger than #8 wire.

Wattages Are Being Increased

Right Across the Country with

FLAMENOL*
SMALL DIAMETER BUILDING WIRE
(For Rewiring Existing Raceways)

Building owners are taking advantage of this synthetic-insulated building wire to obtain increased wattages.

Electrical contractors are using it to sell rewiring jobs that they haven't been able to touch before.

Power companies are pleased with the increased load that rewiring with Flamenol puts on their lines.

Typical Installations—Each Providing Increased Illumination

Office buildings in	
Fresno, Cal.	10,000 feet No. 12 Flamenol
Houston, Texas	100,000 feet No. 12 Flamenol
Omaha, Nebr.	4,000 feet No. 10 Flamenol
Lynn, Mass.	2,000 feet No. 12 Flamenol
Store buildings in	
Sheldon, Iowa	1,500 feet No. 14 Flamenol
Hartford, Conn.	1,000 feet No. 10 Flamenol 6,000 feet No. 12 Flamenol
Lowell, Mass.	2,500 feet No. 14 Flamenol
Albany, N. Y.	2,000 feet No. 8 Flamenol 7,000 feet No. 14 Flamenol

Comments of building owners include:

"Well pleased with result."
"Enthusiastic over savings."
"Rewiring done in record time."
"Office space more efficient now."

Flamenol Building Wire is General Electric's contribution to the great rewiring program being launched by the industry. This small diameter building wire enables existing raceways to be rewired inexpensively.

The present wires in conduit can easily be replaced by more Flamenol wires or Flamenol wires of larger capacity. This is done without the mess and expense that would be caused if new raceways were needed.

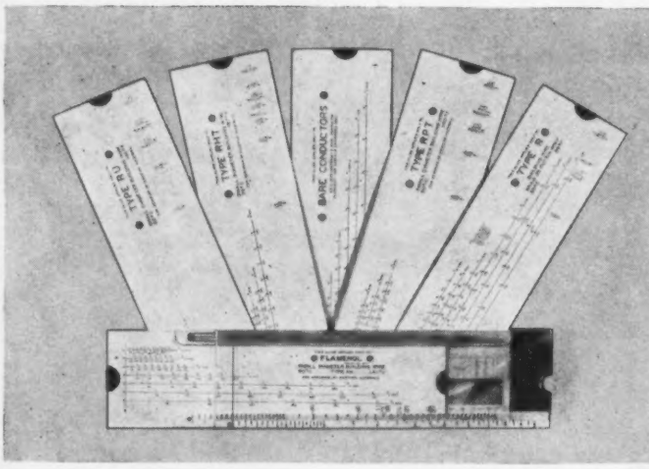
FEATURES OF FLAMENOL

Available in sizes 14 to 4/0 inclusive. Sizes 14 to 8 Flamenol Building Wires have smaller insulation than rubber-covered Type R wires; sizes 6 to 4/0 Flamenol Building Wires have same insulation thickness as Type R wires but absence of over-all braid gives them a smaller diameter.

Insulated with a plasticized polyvinyl chloride compound—no braid necessary. This insulation is superaging, resistant to heat, oils, acids, alkalies, and moisture and has high dielectric and mechanical strength. Same color range as Type R Wires. Approved by the Underwriters'.

For further information about Flamenol Building Wires or for samples, see the nearest G-E Merchandise Distributor or write to Section W-1183, Appliance and Merchandise Department, General Electric Company, Bridgeport, Conn.

*Reg. U.S. Pat. Off.



G-E WIROMETER
For Computing Wiring Problems In Accordance with 1940 N.E.C.

Power salesmen will find the Wirometer helpful in selecting the right wire quickly when making rough layouts. The Wirometer permits quick calculation of conduit fill, current-carrying capacities when three or more wires are run in conduit, etc. Wirometers may be obtained from G-E Merchandise Distributors.

GENERAL ELECTRIC

NEWS of the industry

MARCH means MARCH means MARCH

Bigger bargains

Charges for electric service are being cut to the bone. From all over the West comes news of rate reductions which will save Western consumers millions of dollars per year, most of the new schedules becoming effective this month. Among systems with new low rates: Southern California Edison; Portland General Electric; Northwestern Electric; PS of Colorado; San Diego G&E; Washington Water Power, and Arizona Power Co. For details see p. 86.

Critical vote

Climax of an intensive campaign in which many assertions have been made about the effect of Grand Coulee power on rates, will be March 11, when voters of Spokane will pass upon an ordinance authorizing the city to buy or build an electric distribution system. The vote culminates a program of municipal power proponents which began early in 1940 with the hiring of Burns and McDonnell, consulting engineers, to make a report upon the desirability of municipal ownership in the city. Proponents of the plan, including present and former Congressmen, attempted to link the vote with approval of the Grand Coulee power and irrigation program. Washington Water Power Co., whose distribution system would be purchased if the ordinance passes, contended that the engineering report contained many errors.

There's a law—

Considerable legislation relating to municipal utilities and revenue bonds has been introduced before the 1941 session of the California Legislature. Renewed efforts are being made to authorize revenue bond financing for Shasta Dam power. Included are the following measures:

SB 114 which would permit the issuance of public ownership revenue bonds by majority vote by cities, counties, water districts, irrigation districts and public utility districts. AB 1603, a water and power revenue bond bill. AB 1440 and 1442, permitting the issuance of revenue bonds by sewage disposal districts. AB 1726 and SB 1010 amending the Central Valley Project Act permitting revenue bond financing. Other bills authorizing the issuance of revenue bonds for use by a variety of governmental agencies include SB 1017, SB 842, AB 1726, AB 1817 and AB 1604.

A number of measures have been introduced dealing with installment financing which are of importance to dealers and manufacturers.

How big is 13?

Limitation of utility service company operations solely to fields "with an undisputed right to continue by virtue of necessity of service and economies" will be sought by the SEC Public Utilities Division in applying Section 13 of the Holding Company Act. Just what is meant by a service organization is not yet clear. Some think trade association would be included.

First test of this interpretation, according to indications in the record of the hearings, will come in oral arguments to be scheduled in March in the Atlantic Utility Service Corp. case.

Making politics out of politics

Some action was expected as the result of the prolonged hearings conducted by the FPC on the alleged political expenditures of five Pacific Northwest power companies. Hence it was not surprising when the commission ordered the companies to report estimated figures for all such expenditures for 1941.

As might be expected, the utilities protested, seeking to have the order vacated and asking that the information submitted be kept confidential in the interim. Commenting on the order, one utility man observed that to even matters up the FPC should ask all proponents of public power and all government departments and public agencies engaged in promoting public power to file similar estimates.

Go ahead—and hurry!

With FPC license in hand, Pacific Gas and Electric has a clear field for development of the Cresta and Pulga power plants on the Feather River (Electrical West, February 1941, pp. 48 and 100). Granting the license Feb. 20, despite objections by the Central Valley Authority, the Federal Power Commission said California's share of the defense program will require expeditious construction of these two plants and the earliest possible completion of Central Valley projects as well.

Under terms of the license, PG and E is directed to start work on Cresta this month and complete it by Jan. 1, 1943, and to start and complete Pulga on dates six months later respectively.

"In view of the national emergency," FPC said, ". . . the company shall do everything within its power to complete both developments in advance of the time fixed by the Commission."

Such is PG and E's intention. Also in prospect is the Bear River development. Week before the Feather River license was granted, PG and E outlined its $3,780,000 plan for power on the Bear River near Dutch Flat, in a brief hearing before the California Railroad Commission, meeting in San Francisco. There were no protests.

Vancouver's busy too

Business continues extremely active in the electrical contracting in British Columbia. January set a record in the residential market in Vancouver and adjacent territories, and this is reflected in increased activity amongst electrical contractors. Also on the increase: government contracts awarded in connection with national defense projects.

This is station KGEI

A new 50,000-watt non-commercial radio station will carry American programs from the heart of San Francisco to Latin America, Asia, the Antipodes and South Africa. The station is KGEI which, since 1939, has been broadcasting with 20,000 watts of power from the Palace of Electricity on Treasure Island.

Construction permit for KGEI to install a 50,000-watt transmitter has just been received from the Federal Communications Commission. A building will be erected on General Electric property at Belmont, California, adjacent to the KPO transmitter. Offices and studios will be in the Fairmont Hotel, San Francisco.

The station will be strictly non-commercial, operated to build international good-will. E. T. "Buck" Harris, former San Francisco newspaperman, is manager of KGEI and H. M. Scholes is chief engineer.

IN A BIG RUSH! "DEFENSE" MONEY FOR POWER

National defense is giving the New Deal's public power program its greatest impetus since the early days of the administration. Huge new "speed-up" appropriations running into millions of dollars are being prepared for Congress or already are in the legislative hopper. Public power has definitely been exempted even from the lip-service to economy and is classified as vital to defense.

A large portion of these extra funds being sought now is for accomplishing in the next year or two work scheduled for future years, but not all of it. Funds will be sought this year for a start on a 150,000-kw. steam generating unit to be integrated with the Central Valley development.

In addition to the Central Valley fuel unit, additional millions are being sought to push work on Shasta dam ahead of schedule. Total increase over 1942 budget figures expected to be sought is $37,000,000.

A new project for which funds soon will be asked, years ahead of schedule, is Bullshead Dam, a $22,500,000 hydroelectric power development to generate 180,000 kw. between Boulder and Parker dams. The Bureau of Reclamation is rushing completion of a report on this job for inclusion in requests for supplemental appropriations for the next fiscal year. The project is almost solely for power, inasmuch as it will irrigate only 4,000 acres of land and provide some additional regulation of the Colorado stream flow.

Grand Coulee Dam also is being given a "speed-up" tonic. The President has sent to Congress a request for an additional $7,500,000 appropriation for the current fiscal year and plans are being made to boost the project's 1942 allocation to provide it with funds originally scheduled to be spread over a number of years. With three 108,000 kw. generators already being installed, and another three scheduled in the present 1942 budget estimates, it is now expected that funds will be sought to permit immediate ordering of a third set of three units. These would allow completing the West power house in 1943.

The President's request for an additional $1,000,000 for this year for Boulder Dam also represents telescoping into this spring work originally scheduled for next fall.

Remember those first spring winds? Remember the steady push of the first cold, clean wind, the grass just barely dry, the tug of a brand new kite string?

Soon now, those things will be actualities, not memories, for about a million small men of the West, and there will be kites in the sky.

There are grown men who remember these things. For all over the West the grown men who run the power systems are taking pains to see that the small men who fly the kites will meet with no accident while the spring winds blow.

All over the West, power systems are explaining the rules of safe play to this young kite-flying fraternity.

Off to the first, most vigorous campaign was Southern California Edison, with February advertisements in 180 newspapers. "Play Safe" was the theme. Each ad carried a parallel rule about bicycle riding, crossing streets or playing ball, and three simple, kite-safety rules, written in language that small men can understand.

WHEN PLAYING BALL...
STAY OUT OF THE STREET

When Flying Kites...
Follow These 3 Safety Rules

1. Fly your kite in an open field, away from power lines.
2. Never use wire or tinsel cord, or string that has become damp from rain or fog.
3. If your kite catches in an electric line... let go! Don't try to pull it down. Phone the service company to which the line belongs and a lineman will come to get your kite for you.

SOUTHERN CALIFORNIA EDISON COMPANY LTD.

● TWO HYDRO PLANTS on the All-American Canal began generating power for the Imperial Irrigation District last month. The plant at Drop No. 3, where 4,800 kw. will ultimately be produced, began operating Feb. 18. The Drop No. 4 plant with a 9,600-kw. ultimate capacity began operating Feb. 25. A 25-ft. head is available at Drop No. 3 and a 50-ft. head at Drop No. 4.

● AN ARIZONA POWER SURVEY is about to be undertaken by the Federal Power Commission. FPC's investigation is expected to cover the possibility of accelerated use as a means to stimulating expansion of Arizona and an attempt to forecast requirements by some 20 years.

PRINT IN BINDING

STATION SERVICE units at Grand Coulee are scheduled to furnish outside power this month. Bigger than many a plant's main units, each of the two is 14,000 hp. Scene here is two months ago, when generator rotor was being placed. More about Coulee below and on pages 79, 84

IN WASHINGTON, D.C.— STAFF REPORTER THINKS NEW BILLS BEING BREWED WITH TVA FLAVOR

President Roosevelt has taken at least an indirect hand in the growing feud within the New Deal over a permanent operating setup for the vast multi-purpose federal development of the Columbia River. By blunt inference the President has hinted for creation of an independent authority similar to TVA to take over and operate Bonneville and Grand Coulee dams—not simply distribution of their power but their other purposes as well.

Legislation carving out a second huge TVA is reportedly being prepared under the direction of David Lillienthal, director of TVA and a leader in the group seeking a setup in the Northwest similar to that operating in the Tennessee Valley. Such a bill would be in sharp contrast to a measure already before Congress carrying the hopes of Secretary of the Interior Ickes, which proposes creation of an administrator for the Bonneville-Grand Coulee power distribution. This administrator would report directly to Mr. Ickes; operation of the two dams would be left in the hands of their builders —the Army Engineers in the case of Bonneville and the Bureau of Reclamation, also an agency under Ickes, in the case of Grand Coulee.

Backing the TVA idea for the Northwest, it is understood, is Senator George W. Norris, godfather of the New Deal power cult. Whether Mr. Ickes has any support for his administrator setup outside his own department is not certain.

The President indirectly entered the picture at a press conference in his reply to a question regarding the possibility of the Army Engineers taking over distribution of Bonneville power for defense. Mr. Roosevelt denied the report but added that he thought he knew what was behind it. Continuing, he said the report was just a revival of the old idea that they had when TVA was set up.

At that time, he explained, TVA was created to look after a great many things in the watershed, not just power. It was thought then that if TVA worked out well the idea might be extended to other places. More recently, this program has come to a head again and they thought the Arkansas Valley would be the most logical and proper place to try the TVA idea. They also thought that the Columbia River, because of a number of federal projects, would be a good place.

The whole question, he concluded, is not just a matter of the War Department nor just a matter of power, but is a much broader affair.

The President indicated that legislation for the Columbia watershed has been prepared and that it also includes the Puget Sound watershed.

While this jockeying for position was underway in Washington, a third factor entered the Northwest picture in the form of a "home town" proposal for local control of public power in that area. This scheme is to set up a board of five members, three named by the PUD's in the area and two by the Federal government, to direct distribution of Bonneville and Grand Coulee energy. Speaking for this idea recently has been Miss Veida Morrow, an associate attorney for the Federal Power Commission who was on vacation. A former associate of the late J. D. Ross, first Bonneville administrator and long time municipal power advocate, Miss Morrow said she spoke only her personal opinion. Any plan giving control of power distribution in the Northwest to local agencies is not considered to have much chance in Washington, D. C.

ICKES IS FEELING TOUGH ABOUT SAN FRANCISCO AGAIN

Secretary of the Interior Ickes turned the heat on San Francisco's leasing negotiations with Pacific Gas and Electric Co. February 25, when he advised Mayor Rossi that a formal lease must be in his hands within ten days or he would ask the Federal court to vacate its order suspending its injunction against Hetch Hetchy power sales until July 1. As a substitute for the lease he proposed that arrangements be made for holding a bond issue election for purchase of the PG and E San Francisco system.

PROF. EASTWOOD TO AID AIR CONDITIONING'S BIG WEEK

With two conventions and an exposition ahead, the heating, ventilating and air conditioning industry is making plans for a big week in San Francisco June 16-20. Prof. E. O. Eastwood, head of the Department of Mechanical Engineering at the University of Washington, has accepted the chairmanship of the exposition advisory committee.

● Southern California Edison Co. has obtained a temporary injunction against the holding of a referendum election March 18 on the question of the validity of a 35-year franchise granted by the Long Beach city council. The company contended that the referendum petition was secured through many irregularities and that it is invalid and insufficient to call such an election.

SPRING CLEAN-UP WITH Hotpoint ELECTRIC RANGES

SEE, HOTPOINT GIVES US A CHOICE IN PRICE!
HOTPOINT'S 5 MEASURED HEATS ENABLE YOU TO COOK FAST OR SLOW YET USE LESS CURRENT!
THE HOTPOINT ALL PURPOSE FLAVOR SEAL OVEN CERTAINLY APPEALS TO ME!
THE SELF-CLEANING NEW HI-SPEED CALROD UNIT LASTS A LIFETIME!
I'M CRAZY ABOUT HOTPOINT'S NEW ILLUMINATED SWITCH DIALS!
NEVER SAW SALES BOOM LIKE THIS BEFORE!
BETCHA LIFE, HE'S GLAD NOW HE HITCHED HIS WAGON TO "THE NAME EVERYBODY KNOWS"!
Y, DID YOU ER SEE SO ANY ORDERS? HEY'VE GOT OE DIZZY!
THE NEW CENTURY $99.95 FOB FACTORY CHICAGO INSTALLATION EXTRA. OTHER PRICES START AT $89.95 AT THE FACTORY
EDISON GENERAL ELECTRIC APPLIANCE CO., INC.
5612 West Taylor Street, Chicago, Illinois

Order this quick profit
PROCTOR DEAL
It's $ales$ational!
PROCTOR Challenger
STANDARD LIST PRICE $7.95
ALLOWANCE FOR OLD IRON $2.00
SALE PRICE $5.95 And Old Iron
PROCTOR Champion
STANDARD LIST PRICE $8.95
ALLOWANCE FOR OLD IRON $2.00
SALE PRICE $6.95 And Old Iron
PROCTOR Guardian
STANDARD LIST PRICE $5.95
ALLOWANCE FOR OLD IRON $1.00
SALE PRICE $4.95 And Old Iron
TWICE AS GOOD AS THE SALES-PROVED, TIME-TESTED $1.00 TRADE-IN
$2.00 FOR YOUR OLD IRON
on new Proctor Champion or Challenger Speed Irons

Six Fast-Selling Proctor Automatic Irons In a Quick-Turnover, Full-Profit Assortment

2 Model 970 Champions • 2 Model 971 Challengers • 2 Model 972 Guardians

Standard Retail Value	Old Iron Trade-in Paid by Proctor	Retail Value During Sale
$45.70	$10.00	$35.70*

*Full amount of Trade-in Allowance is Paid by Factory. Your Cost is Based Upon Net List Prices After Allowance Has Been Deducted. You Make Full Profit Upon Every Iron You Sell.

Get this display FREE with your order

plus a complete advertising and promotional package

Includes beautifully lithographed, 6-color counter merchandiser, a big flashy window poster, complete newspaper ads and mats, "$2.00 for your old iron" checks, counter literature, and special sale tags for each iron in deal. Proctor's going places! Here's everything you need to get *your* share!

EXTRA ADVERTISING FREE With Order for Two Deals — 1000 4-page, 2-color, full-size tabloid newspaper flyers with your imprint on page one.

PROCTOR

Makers of the Famous Never-Lift *Iron and Pop-Up Automatic Toaster*

PROCTOR ELECTRIC COMPANY, *Sales Division*

Proctor & Schwartz, Inc., Philadelphia

NW ASSN. SALES GROUP WILL TUNE TO DEFENSE

In the Northwest, this year's sales conference will be tuned to the national defense program. That is the essence of the 16th annual meeting of the Business Development Section, Northwest Electric Light & Power Assn., Davenport Hotel, Spokane, Wash., March 27-29, and the line along which chairman D. B. Leonard is organizing the program.

Many headliners are scheduled to attend the meeting, including: C. J. Strike, president of Idaho Power Co. and president of the Association; Paul V. McKee, president of Pacific Power & Light Co.; Kinsey M. Robinson, president of Washington Water Power Co.; George W. Allison of EEI, and a utility representative from Canada. These and other leaders will appear at the opening session Thursday morning, and on Saturday morning.

Heading up the group who will shape up sales policies at five conferences running concurrently Thursday afternoon and Friday will be: A. H. Greisser, commercial and industrial sales bureau; Frank A. Tool, home modernization committee; W. A. Huckins, home service committee; Ben W. Faber, rural sales bureau; J. Harvey Leach, advertising bureau.

For reservations, address James A. McCluskey, assistant manager of the Davenport Hotel.

REPRODUCTION NEW, BASIS IN SACRAMENTO HEARING

Hearings before the California Railroad Commission on the valuation proceedings against the Pacific Gas and Electric Co. by the Sacramento Utility District have set a precedent in the method of valuation used by commission engineers. Testimony has been based principally upon a reproduction cost new basis in which mass production methods and machinery were assumed to have been used in reproducing the existing facilities.

Because of this there is a wide variance in the valuation submitted by the commission staff and that claimed by the company, the difference ranging between $2,300,000 and $3,000,000 when such factors as interest during construction and overhead are added.

Hearings on the case were conducted through February and will continue for some weeks. Several months will pass before a final valuation is announced by the commission.

● Power Factor Correction on lighting equipment has been ruled by the Montana Railroad and Public Service Commission as a requirement.

Three strikes, and your lights aren't out!

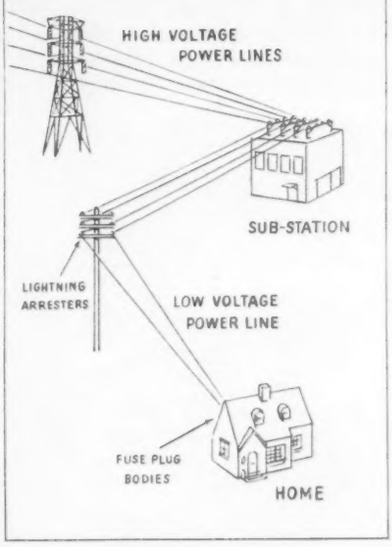
HERE'S an actual photograph of lightning hitting a power line. Maybe some of you remember the old days when this might easily have meant shattered insulators, smoking ruined transformers, hours of work for repair crews to restore service.

Today when lightning strikes, you know the Pyrex Insulators will stick to their jobs all along the line. But did you know Corning Glass Works also makes Pyrex brand glass housings for lightning arresters to protect costly distribution transformers and sub-station equipment? In fact, Corning Glass contributes to the electrical industry right now in ten important ways with:

Power Line Insulators	*Lightning Arrester Bodies*
Telephone Insulators	*Neon Insulators*
Cyclotron Insulators	*Power Fuse Tubing*
Radio Insulators	*Automobile Fuse Tubing*
Ozone Cylinders	*Fuse Plug Bodies*

If you have a problem you think glass might solve, we invite you to write today. Or send for a free copy of our new phamphlet "Glass as an Electrical Insulator". Address Insulation Division, Corning Glass Works, Corning, N. Y.

FROM GENERATOR TO CONSUMER OUTLET . . . PYREX GLASS STANDS GUARD



CORNING *means* Research in Glass

Pyrex Insulators BRAND

NORTHWEST IN A NUTSHELL---TWO SYSTEM-WIDE PURCHASES ARE URGED, WHILE BONNEVILLE EXPANDS

Storms of conflicting interests are raging up and down the Columbia as the Northwest endeavors to untangle its power problem. Meanwhile, a hurricane of activity labelled "necessary for national defense" adds to the confusion. Many a fresh tempest swept through Oregon and Washington during February, but the only influence which gave indications of altering the power storm as a whole was that which blew out of Washington, D. C. (see p. 80).

Meanwhile programs dealing with physical additions surged steadily ahead under impetus of the national defense program. Grand Coulee is about to become an actual power source, and March 21 is written down as the probable date when power from two 14,000-hp. station service units will be poured into the transmission line to Bonneville. At the end of February Westinghouse announced that 1,000 tons of waterwheel generator was on its way to Grand Coulee in 38 freight cars via 12 different railroad systems. This knocked-down machine is the world's largest, 108,000 kw., and is the first of three being built for Grand Coulee.

First Coulee Contract

As these developments were afoot, a customer of negligible size when considered in relation to the Grand Coulee plant itself, became the first contractor for Grand Coulee power. On Feb. 20, Nespelum Valley Electric Cooperative, Inc., an REA system with about 100 customers, signed with the Grand Coulee-Bonneville Authority for energy expected to be delivered about May 1.

Bonneville

Down the river at Bonneville, biggest news of the month was the signing of a contract with Reynolds Metals Co. of Richmond, Va., which will within the next 30 to 60 days start construction of a two-unit aluminum plant which, upon completion to capacity, will take 40,000 kw., turning out 4 million lb. of aluminum a year. Production, initially below capacity, is scheduled to begin June 15.

Expansion in many another direction was announced by the Bonneville Administration through the month including: approval of a $100,000 substation to be built at Cosmopolis, Wash., for service to the Grays Harbour area; approval of a $125,000, 42-mi. transmission line to be built south from Eugene to Grain in Douglas County; allocation of $20,000 for surveys for transmission from Pendleton to La Grande, Ore.; allocation of $35,000 toward preliminary survey of 60 mi. of 66-kv. transmission to serve Corvallis, Newport, Walzport.

Received by the Administration was an application by Oregon's proposed Baker County PUD for 7,000 kw.

Administrator Raver released his third annual report during the month showing 5,478,244 man-hours of work that has gone into Bonneville and Grand Coulee Dam during three years of the Administration's existence, representing a cumulative payroll cost of $5,035,108. For the fiscal year ending June 30, 1940, there were over 3,900,000 man-hours of direct labor, with payrolls over $3,600,000.

Power Deals

Big deal—that for acquisition of Puget Sound P & L as a whole—took the form of continued negotiation without any definite developments. Representatives of Bonneville and of Engineers' Public Service Corp., which controls Puget Power, were conferring in New York, while Z. A. Ziedell—who had sat in on some of the negotiations representing PUD's of the area—made things more confusing by advising PUD's to resume condemnation proceedings which were suspended when negotiations began some weeks ago.

In the face of this life-and-death crisis, action of the city of Bremerton, Wash., amounted to no more than an irritation in the toe. Bremerton filed suit in the Kitsap County superior court to force Puget Sound to negotiate with the city for the sale of its Bremerton property.

Eastern Oregon

Another plan for total system purchase was progressing in Oregon, subject of study being books of Eastern Oregon Light & Power. Scheduled to get under way soon is a three-way negotiation involving the company, Bonneville, and PUD representatives. The deal in its present form is for Bonneville to buy the transmission system and PUD's the distribution system.

Other Deals

These two major situations tended to overshadow several others, among them a petition by seven mid-Columbia PUD's in Washington asking the Bonneville Administration to help them negotiate for purchase of those Pacific Power & Light Co. properties which lie within the area.

Among other developments: As far south as Klamath Falls, Bonneville power was an issue. A Klamath County-Bonneville power committee was formed for the purpose of endeavoring to have a Bonneville-Shasta transmission line routed through its territory. In Umatilla County, Ore., a petition was filed for creation of a PUD there. It would embrace 306 sq. mi. with a population of 5,000. In Yakima County, Wash., it was announced that when the PUD becomes operative there, it will absorb lines of the Benton Rural Electric Assn. Some 300 mi. of rural line are involved.

R. E. FISHER'S TABLE. When Nathan Dohrmann Co. invited prominent San Francisco business men to join in a show of table settings by men, Vice- President Fisher, of PG and E, did this one—a ranch lunch setting. Table base is a cable reel, the top a row of crossarms, cover a tanned cowhide. Centerpiece is a neon cowboy flanked by disc insulators containing flowers from Westinghouse Emeryville plant. Insulator parts serve as tumblers, as salad bowl and as dishes

Summer's Saddest Moment : : : : BY WEBSTER

WHAT! NO G-E FANS? SORRY, BUT THAT'S WHAT I WANT! GOOD DAY!
SWELTERING JOE PUBLIC KNOWS WHAT HE WANTS TO KEEP HIMSELF COOL---- AND GETS STILL HOTTER AT TALK ABOUT SOMETHING "JUST AS GOOD"
WEBSTER

Stock G-E Fans—and Breeze Along with the Line Accepted as Tops!

Sail ahead with the leader, G-E! The line of fans that's tops in demand. The line of fans that's most complete. The line of fans that carries the best-advertised name in the whole electrical business!

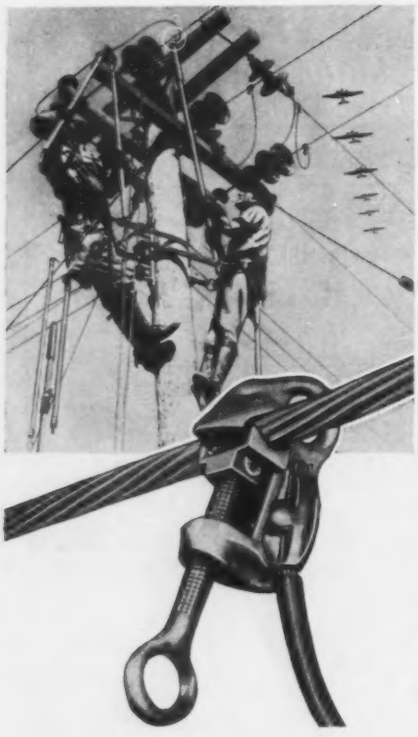
Your G-E distributor offers you a better deal than ever for 1941. A new, still faster-moving group of fans at lower prices. Free promotion that hits a new high in fan sales helps. The sweetest set-up for fan dealers you've heard in all your days. Hear the G-E story, and you'll agree it's a wise dealer who goes G-E.

Fan Sales Section, Appliance and Merchandise Department, General Electric Company, Bridgeport, Conn.

YOU GET ALL THIS POWERFUL PROMOTION *FREE!*

1. A 10-color action *Window Display* that will stop 'em, hold 'em and sell 'em.
2. Handsome *Catalogs* crammed with facts and illustrations that build sales.
3. Direct *Mail Pieces* that "get in the door" of homes, stores, offices.
4. Local newspaper *Ad Mats* that help you sell when your market is "hot."
5. Powerful *National Newspaper Ads* in over 175 key cities — run when you need them—in local hot weather.

GENERAL ELECTRIC



Tap New Service Extensions with...

TIPS PERMA-GRIP TAP CLAMPS

Preparedness is a good idea in line construction, too. The use of Tips Perma-Grip Tap Clamps on service extensions prepares the line for quicker, easier maintenance without service interruptions. Build the extensions and tap them in hot with the Grip-All Clamp Stick and Tips Perma-Grip Tap Clamps—made in a variety of sizes for every job. Perma-Grips give you three point positive contacts, proper electrical conductivity, high mechanical strength, and quick easy application.

A·B·CHANCE CO. CENTRALIA MISSOURI

SLUE OF RATE CUTS IN EFFECT THIS MONTH

A 1½ million dollar reduction in the rates of Southern California Edison was the biggest single saving to consumers in a whole series of rate reduction schedules to become effective throughout the West in March, but equally spectacular in terms of size of system, and in view of the fact they come on top of other recent slashes, were reductions by Washington Water Power, Portland General Electric and Northwestern Electric.

Edison

While the exact schedule of the new Edison rates remains to be announced, it is understood the $1,500,000 saving will be distributed principally in the domestic and commercial classes. The new rates will become effective during March, and the gross reduction was arrived at in conferences with the California Railroad Commission held at Visalia and at Los Angeles.

Washington Water Power

Washington Water Power's reduction is believed to be the largest single cut in the company's history, saving residential, commercial and industrial users $750,000 a year, $400,000 applying to the city of Spokane.

The reduction is the third major one since June 1939, the three totaling $1,470,000. It embraces two residential rate schedules, one covering all users, and the other affecting customers who retain either the flat rate or separately metered 8-mill water heating service. Customers having either of the latter services will have the option of changing over to "all-service" schedule. President Kinsey M. Robinson gave four reasons why the company was able to make a reduction: (1) Refunding of bonds at a lower interest rate in 1939; (2) a remarkable increase in use, average residential kw.-hr. consumption now standing at 2,174; (3) curtailment of generation construction because of anticipated purchases from Grand Coulee; (4) a desire to approach the government yardstick rate, adjusted for taxes, leading to the combining of this year's reduction with the greater part of that originally planned for 1942. The new rates became effective February 3, according to the following schedules:

All-Service Residential Schedule

First 12 kw.-hr. or less)	50.0c
Next 50 kw.-hr. at	3.0
Next 50 kw.-hr at	2.0
Next 100 kw.-hr. at	1.5
Next 600 kw.-hr. at	0.6
All additional at	1.0

Residential Flat Rate or Separately-Metered 8-Mill Water Heating

First 12 kw.-hr. (or less)	50.0c
Next 60 kw.-hr. at	3.4
Next 100 kw.-hr. at	2.3
All additional at	1.5

Commercial Schedule

First 12 kw.-hr	50.0c
Next 188 kw.-hr. at	3.3
Next 300 kw.-hr. at	2.2
Next 3,000 kw.-hr. at	1.1
Next 15,000 kw.-hr. at	0.9
All additional at	0.3

Portland

Portland General Electric's new schedule affects commercial classifications to the extent of $485,000 per year and upon approval by the state utilities commissioner will become effective March 25. An identical schedule by Northwestern Electric will save its commercial customers $200,000 per year.

Proposed is a straight block rate without demand charge for loads up to 10 kw. Steps are those advocated by the Bonneville Power Administration and the rates per kw.-hr. are the Bonneville standard rate for commercial establishments plus a surcharge of 20%, which is roughly the amount of the company's taxes. The rate starts at 3½c for the first 150 kw.-hr. and runs down through five steps to 0.63c per kw.-hr. for all over 100,000 kw.-hr. per month. The company considers the surcharge above the objective rate temporary.

For loads above 10 kw. a demand charge of $1.14 per kw. is charged. The new schedule also provides for a rebate for load factors above 50%.

Colorado

The reductions at Colorado affect four western slope towns served by Public Service Co. of Colorado, and two Denver suburban communities served by Arvada Electric Co. Following a recent cut for the city and county of Denver, the schedules apply to all types of users in Grand Junction, Palisades, Fruita and Rifle amounting to $28,500. Arvada and Westminster, adjacent to Denver, will benefit to the extent of $4,700 per year.

Arizona

Savings in the Prescott area will amount to more than $15,000 per year, effective on March bills, according to new schedules filed with the Arizona Corporation Commission by Arizona Power Co. Most of the saving goes to residential consumers. Their rate will be $1 for the first 7 kw.-hr., 6c for the next 43, 2½c thereafter.

San Diego

L. M. Klauber, vice-president in charge of operations for San Diego G & E won praise from California Railroad Commissioner J. F. Craemer in connection with the rate reduction there which will save consumers $200,000 per year, as of March 1. Craemer mentioned Klauber's cooperation with the Commission in his policy of continuous investigation. The March 1 reduction follows one of like amount made just a few months ago, and will be in accordance with schedules being worked out with the Commission.

ELECTRIQUIZ ANSWERS

(Quiz on p. 65)

1. True, according to the World Almanac.
2. True. In the United States copper wire is measured by the American wire gauge, while iron is measured by the Birmingham wire gauge. The galvanizing has nothing to do with it.
3. False. In the last consecutive twelve months for which figures are available, the average annual use per customer in California was 4411 kw.-hr.
4. False. Both have the same relative conductivity.
5. False. PCEA maintains a list of "talent" on which there are approximately 100 good speakers on timely electrical topics.
6. False. Any company connected with the electrical industry is eligible for PCEA membership, and any employee of a member company is eligible for persona! membership.
7. You supply the answer. If it is "false," you had better hurry to read it. This wiring story means money in the pockets of everyone who understands and follows it.
8. False. Electric ranges are wired for 220 volts.
9. False. Seven hundred and forty-six watts equal a horsepower.
10. False. You would have an electro-magnet.

"WHO AM I?"

Answer to "Who Am I?" (see p. 65): W. P. L'Hommedieu.

...against costly breakdowns!

YOU can reduce turbine maintenance, get long, trouble-free service, by switching to Unacal Turbine Oils.

Carefully refined and blended, Unacal Turbine Oils defeat emulsification, oxidation, sludge and foaming—most common enemies of turbine lubrication.

Unacal Turbine Oils are available in any four grades to suit your turbine, whether steam or water-operated, direct connected or geared. Extra heavy grades for high speed, heavy duty Herringbone and Helical Reduction Gears and Kingsbury Thrust Bearings.

Unacal Turbine Oils have a record of over fifteen years of successful service in turbines of all types. Why not start today by getting the correct grade for your turbine?

Your nearest Union Oil agent will be glad to give you further details. Call him today!

UNACAL TURBINE OILS

An Industrial Product of

UNION OIL COMPANY

FOR OVER 50 YEARS—OPERATED BY AND FOR WESTERNERS

PEOPLE

made this news

TASSIE RETURNS TO COAST TO HEAD NEW DISTRICT

Ben M. Tassie has returned to the Pacific Coast after an absence of eleven years. He will be manager of appliance sales for the newly consolidated Pacific district of the General Electric appliance and merchandise department with headquarters in San Francisco. A leading executive in the appliance industry for the last decade and a member of the NEMA board of governors for the last five years, Tassie has been connected with the electrical industry for half a century. From 1915 to 1930 he was Pacific Coast district manager of Manning Bowman & Co., electrical appliance manufacturers. In the latter year he was elected a vice-president of the organization and transferred to Meriden, Conn. A year later he became president, a position he held until he resigned to join General Electric.

The new appliance sales district which he heads includes California, Oregon, Washington, Nevada, Arizona, Utah, Idaho, Montana and part of South Dakota and Wyoming. George S. West and R. M. Loughrey, who formerly were

TASSIE

managers of smaller districts that now have been dissolved, have been assigned to Tassie's staff from their present headquarters in San Francisco and Portland, respectively. Earl W. Brown, formerly district appliance sales manager in Salt Lake City, has been appointed district representative for refrigeration sales with headquarters in Portland. J. J. Burns, formerly assistant district manager in San Francisco has been appointed district representative for electric clock sales with headquarters in San Francisco.

● BEN PERGA has been appointed district manager for the state of Montana for Westinghouse Electric Supply Co. with headquarters at Butte. He has been with the company since 1923, starting as warehouse clerk. He succeeds John W. O'Neill who was promoted to the northwest district managership at Portland.

VIC HARTLEY HONORED FOR 20 YEARS WITH PCEA

Victor W. Hartley, managing director of the Pacific Coast Electrical Association, was honored recently at a luncheon given by the Los Angeles directors of the association observing his completion Feb. 1, of 20 years' service with the organization.

Vic went to work for the California Electrical Cooperative Campaign Feb. 1, 1921, and was with that organization throughout its transformation into the California Electrical Bureau, the Pacific Coast Electrical Bureau and finally its consolidation with PCEA.

● J. W. O'NEILL, formerly manager Westinghouse Electric Supply Co., Butte, Mont., has taken over the managership of the Portland branch. He succeeds C. R. Bach.

MANPOWER FOR DEFENSE—EXECUTIVES AID INDUSTRIAL DRIVE

Attack from a new direction caused fresh casualties in the industry's ranks through February. This phase of the defense program finds top-flight men being drawn into industrial, as distinguished from strictly military, service.

In the Northwest, Harrison G. Winsor, major general on the retired list, personnel officer of Puget Sound P & L, was chosen district representative of the Training-Within-Industry Committee of the National Defense Council.

Laurin E. Hinman, Vancouver Division manager for Portland General Electric, took a 60-day leave-of-absence to function as coordinator with the same four-state industrial advisory group.

Dr. Adam S. Bennion, assistant to the president, Utah P & L, accepted appointment as T-W-I adviser for the northern California, Utah and Nevada district.

Canada borrowed the services of W. C. Mainwaring, who heads BC Electric Railway's merchandise division. He will travel the Dominion, maintain headquarters in Ottawa, as assistant to the chairman of Canada's 1941 War Savings drive.

Although there was a let-up in the calls for officers:

C. A. "MIKE" KELLEY, retired purchasing agent, Nev-Cal Electric Corp., accepted an important post in the army's procurement division in Washington, D. C.

F. L. ELEY, Southern Cal Edison engineer, went on duty as Lt. Commander, 11th Naval District, San Diego.

● HARRY J. BAUER, president of Southern California Edison, has been elected to a twelfth consecutive term as president of the Automobile Club of Southern California.

RECLAMATION BUREAU SHIFTS ITS ENGINEERS

E. A. Mortz will be in charge of power operations at Boulder Dam, his name heading the list of three shifts in engineering personnel by the Bureau of Reclamation in the West. Irving C. Harris, director of power at Boulder Dam for the past three years, goes to Shasta Dam where he will be in charge of machinery installation. S. A. McWilliams, who has been resident engineer on the Minidoka Project in Idaho, goes to Parker Dam as construction engineer on the power plant.

● M. M. MCINTIRE, engineer from the Denver office of the U. S. Bureau of Reclamation, has been attached to the Sacramento office for the purpose of surveying the potential markets for Shasta Dam power. A native Californian, he was engineer for the Merced Irrigation District during the construction of the Exchequer Dam and power house on the Merced River.

● GEORGE E. KELLY, crack home appliance salesman, supervisor and former head of Portland General Electric Co.'s home and kitchen planning bureau, has joined the staff of General Electric Supply Corp. in Portland.

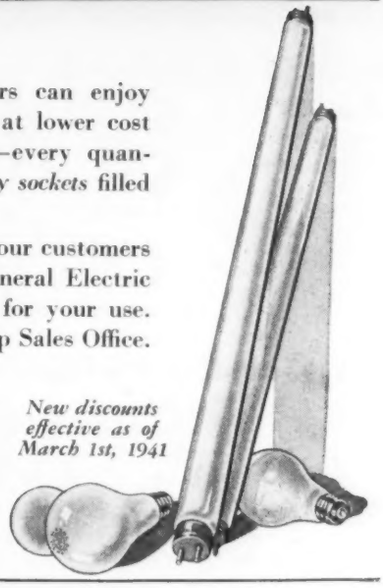
General Electric Announces Lower Prices on Quantity Purchases of G-E MAZDA Lamps!

EMPTY sockets will be filled with right size G-E MAZDA lamps in thousands of factories, offices, stores, apartments, yes and in many homes, too—as these new, larger discounts are publicized through G-E advertising in magazines and on the air!

Now the small factory, office, shop, restaurant can buy the lamps they *prefer* at generous discounts even on purchases as low as $5.00!

It means that your customers can enjoy Better Light for Better Sight at lower cost than ever before. Remember—every quantity purchase means *more empty sockets* filled with right size lamps!

Because you will want to tell your customers about these new discounts, General Electric has newspaper mats available for your use. See local General Electric Lamp Sales Office.



G-E MAZDA LAMPS

GENERAL ELECTRIC

New discounts effective as of March 1st, 1941

NEW! **65-WATT G-E MAZDA F (FLUORESCENT) LAMP** available April 1st. Of special interest to stores, hotels, restaurants, clubs, offices! Colors: Daylight and 3500° White. Size: 36" length, 2⅛" diameter. List price $2.75.

LOW MOVES TO N. J. TO HEAD ROEBLING SALES

Ernest C. Low has been appointed general manager of sales of John A. Roebling's Sons Co. and will make his headquarters at the Trenton, N. J., works after March 1. Low has been connected with the Roebling organization for 32 years, having joined the Los Angeles office upon graduation from college in 1909.

He served in various sales capacities until he was appointed manager of the San Francisco branch in May, 1930. Upon the retirement of Fred Hammond

LOW

in January 1940, Low was elected president and general manager of the John A. Roebling's Sons Co. of California. He has been active in many electrical organizations in California, including the PCEA, the San Francisco Electric Club and the Northern California Electrical Bureau.

SNYDER TO LA BUREAU JOB

Charles C. Snyder has been appointed business agent for the Los Angeles Bureau of Power & Light. In his new capacity he directs sales promotion activities. Formerly an assistant business agent, Snyder has been with the Bureau for 18 years. He holds an electrical engineering degree from the University of California.

KNOWLES MADE A MANAGER

Aubrey Knowles has been appointed Missoula Division Manager for the Montana Power Company. Knowles was born in London, England, went to Montana in 1910, has been in the power business 30 years, joining the Montana Power Company on its organization in 1912. Prior to 1910 he was associated with electrical concerns, in Canada, Idaho, Washington, California, Pennsylvania and in the West Indies.

● COMFORT AVERY ADAMS, consulting engineer, Edward G. Budd Mfg. Co., will receive the 1940 Lamme medal of the American Institute of Electrical Engineers this summer for his contribution to the theory and design of alternating current machinery and his work in the field of electric welding.

● HARRY KELSEY, acting manager of the Cowlitz County PUD, Longview, Wash., has been named permanent manager. He formerly served as sales manager for the Grays Harbor PUD.

● WILLIAM FITZSTEPHENS, manager at Belgrade for the Montana Power Co., has retired.

OFFICERS

For Northern Cal Bureau

Officers for the Northern California Electrical Bureau were elected in February with O. R. Doerr, Pacific Gas and Electric Co., heading the list as chairman of the Executive Committee. George C. Tenney, editor of ELECTRICAL WEST, was elected treasurer. Elected to the Executive Committee were: W. E. Ayden, the Electric Corporation, San Francisco; C. W. Goodwin, Jr., G-E Supply Corp., San Francisco; W. P. L'Hommedieu, Westinghouse, San Francisco; Ralph B. Peterson, Garnett Young & Co., San Francisco; John F. B. Ross, PG and E, San Jose; K. M. Ryals, Stone-Ryals Electric & Mfg. Co., San Francisco.

For the AIEE

Nominations for officers of the American Institute of Electrical Engineers has resulted in the official ticket of candidates for offices becoming vacant August 1st. David C. Prince, manager of G-E's commercial engineering department, is up for president.

From the West as regional vice president are Arthur L. Jones, commercial vice president and district manager in G-E. Denver, and Walter C. Smith, G-E Pacific District engineer, San Francisco, for the north central and Pacific districts respectively. Lester R. Gamble, electrical engineer, Washington Water Power Co., Spokane, is nominated for director.

● O. R. DOERR, general sales manager, Pacific Gas and Electric Co., has been elected president of the San Francisco Electric Club for 1941-42. He succeeds K. M. Ryals of Stone-Ryals Electric & Manufacturing Co. New directors include J. P. Carson, San Francisco manager, Graybar Electric Co., Inc.; E. A. Long, Pacific Gas and Electric Co. and Garth Chamblin, California Electrical Construction Co. Clark Baker was re-elected secretary-treasurer.

DEATHS

Harry Ross succumbs to short illness, ending long career

Harry C. Ross, who only three months ago was appointed personnel manager of Pacific Gas and Electric Company, died February 21 in a San Francisco hospital following a few weeks' illness. He was 59. Mr. Ross began his utility career in Baltimore, Md., when he was 16 years old, became superintendent of the plant there only seven years later, and later worked with utility companies in Pittsburgh, Pa., and southern California.

Richard Cooke dies. He headed Hawaiian company 28 years

Richard A. Cooke, for the last 28 years president of the Hawaiian Electric Co., Honolulu, died February 16 following a heart attack. A member of a pioneer Island family, Cooke was born in Honolulu in 1884. He was graduated from Yale in 1906 and returned to Hawaii to begin an active career in the territory's industrial and business life.

He was manager and later president of C. Brewer and Co., Ltd., sugar factors and was president of the Hawaiian Sugar Planters' Association in 1935 and again in 1940. His association with Hawaiian Electric began in 1909 when he was made a director. He was elected president in 1913 and held that office until his death.

● GUS KOHLS for over 31 years associated with C. B. Kenney, electrical contractor, San Francisco, as his construction superintendent and manager of the Oakland office, died after a long illness Jan. 29 at Oakland. Kohls and Kenney were associated in the old Ne Page-McKenny Co. in Seattle and later in San Francisco.

● EUGENE L. KNIGHT, for many years owner of the E. L. Knight Electric Co., Portland, Ore., died in Portland after an extended illness. Old-timers recall his being active in the formation of electrical contractors' associations and his early interest in the original electrical inspectors association formed in the Northwest.

● ARTHUR PECK, Westinghouse Supply Co. salesman in the Oakland territory, died Feb. 16.

● C. H. CHRISTENSEN, manager of the Missoula division of Montana Power Co., died recently at Missoula. Beginning with Montana Power Co. in the early 1900's, he had been associated with its early development.

● FRANK W. HOWE, retired electrical contractor, died at the age of 70 years at his home in Los Angeles, Feb. 10. He was a native of Oakland.

THE SATURDAY EVENING POST 77

How 7,000,000 lamp bulb purchasers can put SPRING IN THEIR EYES!

● In too many homes, neglect or bulb-snatching has put the wrong-size lamp bulb in important seeing sockets . . . places where youngsters study, where older people read and sew. Eyestrain is serious. Right size lamp bulbs cost little to buy—little to use, so why encourage trouble? Protect your family's eyesight and bring Spring freshness to their seeing by making sure that every socket is filled with the right-size G-E MAZDA lamp bulb.

How to tell a wrong size lamp bulb
We suggest this simple guide: in reading lamps your G-E MAZDA lamp bulbs should total at least 100 watts, properly shaded; for sewing or mending, you need about three times as much. Better still, drop in and ask your lamp dealer to help you choose the right size G-E MAZDA lamps.

G-E MAZDA* LAMPS
GENERAL ELECTRIC
★ MAZDA—not the name of a thing but the mark of a research service

85,000 DEALERS will get this G-E tie-in display for RIGHT-SIZE LAMP MONTH

THIS AD WILL FILL MILLIONS OF EMPTY SOCKETS THIS MONTH!

THIS POWERFUL four-color ad appears in March 1st Saturday Evening Post. Here's an activity built to order for you. Thousands will see this compelling four-color right lamp message in the March 1st Saturday Evening Post and March 2nd American Weekly. Thousands more will see reprints of this ad in dealer's windows and on dealer's counters.

AND HERE'S WHAT YOU CAN DO ABOUT IT

1. Feature Right Size Lamps in your own lamp displays.
2. Urge dealers to use Right Lamp display material.
3. Tie up with Right Lamp advertising in local papers. Newspaper mats available.

TRADE notes

PROCTOR STOCKS IN S. F.

Complete West Coast stocks of Proctor appliances will be warehoused in San Francisco in the future according to Charles P. Cuthburt, Western sales manager of Proctor Electric Co. Established as a customer service to insure prompt fulfillment of all orders, the warehouse stock will supply all customer requirements. There will be no penalty for shipments from this stock.

This announcement is coincidental with a national electric iron merchandising campaign which features a nationally-advertised trade-in allowance for the customer's old iron. Two models of iron will carry a $2 trade-in and one will feature a $1 allowance. A complete promotion program has been made available for dealers.

LAPP FOR LAPP

Dean H. Lapp has taken over representation of the Lapp Insulator Co., Inc., in the Pacific Northwest. His headquarters will be in Seattle. Youngest son of John Lapp, president of the company, Dean Lapp has been with the organization a year since graduation from college where he specialized in electrical and ceramic engineering.

MULLIN FOR MULLIN

Robert W. Mullin has been appointed territorial manager for the California, Oregon and Washington region for the Youngstown Pressed Steel Division of Mullin's Mfg. Corp.

MULLIN

W. H. BINTZ COMPANY'S new plant at Salt Lake City was a fit monument to the organization's fiftieth anniversary. It is situated at Rio Grande Ave. and Third Street South, comprises new offices and warehouse for the electrical jobbers

● HALLADAY & GRUMEY have dissolved their electrical contracting business formerly operated at 625 Sixth street, New Westminster, B. C.

● FREDERICK SIMPSON is now operating a radio service department in conjunction with the radio department of both the Armstrong Furniture Store and A. Smith & Son at Armstrong, B. C.

● R. J. CRUMP is the new Silvray Lighting Co. representative at Graybar Electric Co. in Los Angeles. He was transferred there from the Ohio Valley.

GENERAL CABLE APPOINTS

Indicative of the increasing importance of its Pacific Coast business and manufacturing operations, General Cable Corp. has announced the appointment of C. R. Myer as executive representative for the West Coast reporting to the president, D.R.G. Palmer. Myer's headquarters will be in San Francisco.

James Crilly, Pacific Coast manager of sales, with J. C. Pyle and W. E. Wallace, the Los Angeles and Seattle branch managers respectively, will function as heretofore, handling the company's sales and customer relations.

● NEW APPLIANCE DEALER in Salt Lake City is Standard Sales Co. at 2219 Highland Drive, Fred A. Sweet, manager. It is a Westinghouse store.

● THE COURSE OF SALES for the coming months was charted for Westinghouse salesmen of the San Francisco Bay area, Sacramento and Fresno at a meeting held February 24. Winding up a record year and facing the prospect of even more business, district manager Charles A. Dostal discussed plans for filling normal peacetime requirements and at the same time supplying electrical apparatus to meet the emergency defense program.

● TO CATCH CUSTOMERS ON THE BOUNCE, Pacific Appliance Co., at 2267 Mission St., San Francisco, has opened a branch store directly opposite the Sears Roebuck store at 3151 Mission St. The second store is known as Modern Appliance Co. Frank Mango is the manager of the new branch, according to W. Heyman, manager, Pacific Appliance Co.

CONTRACTS---

To WESCO, Salt Lake City, $10,747 for constructing a system of concrete-encased underground ducts for the government's 37-millimeter shell loading plant at Ogden.

To THE NEWPORT CONSTRUCTION CO., Portland, Ore., $198,289 to build 264 mi. of line for Wasco Electric Cooperative, Inc., The Dalles, Ore., an REA project.

To MAX J. JUNEY CO., Spokane, Wash., $190,726 to build 283 mi. of line for Lincoln Electric Cooperative, Inc., of Davenport, Wash., an REA project.

To STONE & TOWBRIDGE, $35,000 for supplying G-E transformers to the City of Tacoma, Wash.

To V. MAGGIORA, $27,250 for street lighting system at San Rafael, Calif.

MOVED---

TRADE WIND MOTORFANS, INC., Los Angeles, to larger quarters at 5725 South Main St. The telephone is ADams 5217.

SMOOT-HOLMAN CO. offices in San Francisco to 460 Seventh St.

W. H. BINTZ CO., of Salt Lake City, to new offices and warehouse at Rio Grande Ave. and 3d S. St.

FRESNO APPLIANCE STORE from 1156 Fulton to 1344 Fulton, Fresno.

ELMER SHEETS, electrical appliances, from 301 North Spadra, Fullerton, Calif., to 313 North Woods St.

PIONEER ELECTRIC CO. of Richmond to 929 Chans Ave.

PARKHURST APPLIANCE CO. from 1402 Wilshire Blvd., Santa Monica, to 1404 Santa Monica Blvd.

GILDNER ELECTRIC CO., Portland, from 835 S. E. Seventh Ave., to 2450 S. E. Seventh Ave., to 2540 S. E. Belmont.

"Here's a bargain I'd go for, Mr. Dealer— a *UNIVERSAL* electric iron and ironing board—a $9.95 value for only $7.95!"

UNIVERSAL'S **Big Spring Special is a bargain ALL women will go for...a $9.95 value for only $7.95, that will speed up sales, increase profits!**

"THE HOSTESS" IRONING TABLE... *a 5-Star Value!*

★ Large Ironing Surface 15 x 54 inches

★ Opens and Folds in One Operation

★ Light in Weight

★ Sturdy Construction

★ Rubber Safety Shoes Grip Floor—NO Marring

The Hostess Ironing Table with its five-star features combines with the new Universal Streamlined Automatic Iron to give you a "special" designed to build floor traffic and to boost profits.

UNIVERSAL Streamlined Automatic Wrinkle-Proof Iron

New, Cool Easy-Grip Handle ★

Finger-Tip Automatic Control ★

New, Cool Heel Rest ★

★ Wrinkle-proof Round Heel

★ Non-Tarnishing Chromium Plate

$9.95 Value to retail for only $7.95 FOR BOTH!

This new Universal Streamlined Automatic Iron in combination with the Hostess Ironing Table gives you a sure-fire offer to help capture the electric iron replacement market. Order your supply of Model No. 7885-41 now.

Dealer's Cost $5.30

Wire or write your order today! Offer good for limited time only!

UNIVERSAL

THE TRADEMARK KNOWN IN EVERY HOME

LANDERS, FRARY & CLARK • New Britain, Conn.

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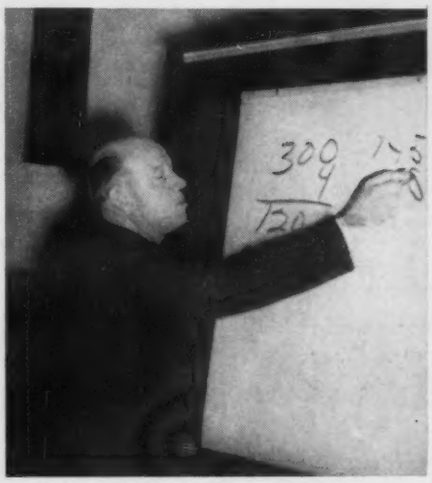
PROFILES *of the month*

W. H. Dudley, Frigidaire's Los Angeles sales manager (above), and Maj. Anderson, Hotpoint specialist (below), told Edison dealers how to sell ranges and water heaters in preparing for the current Electric Range Popularity Sale



At the NEWA Del Monte meeting were (top to bottom) Earl Fisher, PG and E; Roy Grettum, Eastern Oregon L & P; N. J. MacDonald, Thomas & Betts vice-president from Elizabeth, N. J., and Harold Conklin, Hotpoint, Los Angeles and Harry Gerster, G-E Supply Corp., Seattle

Hotpoint's 1941 line was described to 250 Intermountain dealers by D. H. Capelli, Graybar appliance mgr.; Bert Rowley, Hotpoint district mgr., and Roy Kimberlin, Graybar Salt Lake mgr.

Preview of coming campaigns by

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

ELECTRIC APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

COMMANDS MORE SERVANTS THAN ALADDIN'S LAMP

ELECTRIC APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

A Complete

ELECTRIC RANGE AND WATER HEATER CAMPAIGN

Here's a campaign that has **everything!**

ONE—a price inducement of $30 on ranges and $10 on water heaters—both discounts **in addition** to the usual trade-in allowances.

TWO—advertising—**all sorts of advertising**—everything from big newspaper pieces—to bill inserts—to direct mail—to wall and window posters—and many other items!

THREE—a special appropriation to assist in **dealer advertising,** a plan whereby we pay 1/3 of all newspaper space costs (and of the remaining 2/3, the supplier pays half!)

COUNT THE VALUE OF THESE THREE FEATURES!

Can you imagine any campaign offering more to the customer?—or to the dealer?

STARTS MARCH 1

EW 103-341

DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Electric Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Electric Appliance Society, 1355 Market St., San Francisco, Calif.

LIKE A COMB WITHOUT TEETH

As far as the electrical industry is concerned, a home without adequate wiring is in the same class with a comb without teeth---its essential features are missing.

Here's what happens when inadequate wiring is installed in a home: The wiring contractor takes a smaller profit. The wiring manufacturer sells less equipment. Appliance manufacturers and dealers lose part of their market, because homeowners won't buy electrical appliances if they haven't the facilities to use them. The utility sells less electricity, and the homeowner doesn't get the advantage of lower electric rates.

Everybody makes more profit when homes have adequate wiring with plenty of convenience outlets. Make it your business to promote adequate wiring in every way you can. Talk it up with customers, mention it to your friends, print it in your advertising . . . do your share to make every person in your community conscious of the advantages of adequate wiring.

SOUTHERN CALIFORNIA

ALL-WINTER SUN FESTIVAL

PACIFIC COAST ELECTRICAL BUREAU

601 WEST 5TH STREET, LOS ANGELES • 447 SUTTER STREET, SAN FRANCISCO

CERTIFIED ADEQUATE RED SEAL STANDARD WIRING